

Radio Control **CAR ACTION**

THE WORLD'S LEADING R/C CAR MAGAZINE

November 1996

exclusive photos!

FIRST LOOK!
Losi's new 4WD racer

DOUBLE HEADER

TWO NEW CARS THAT WILL BLOW YOU AWAY!

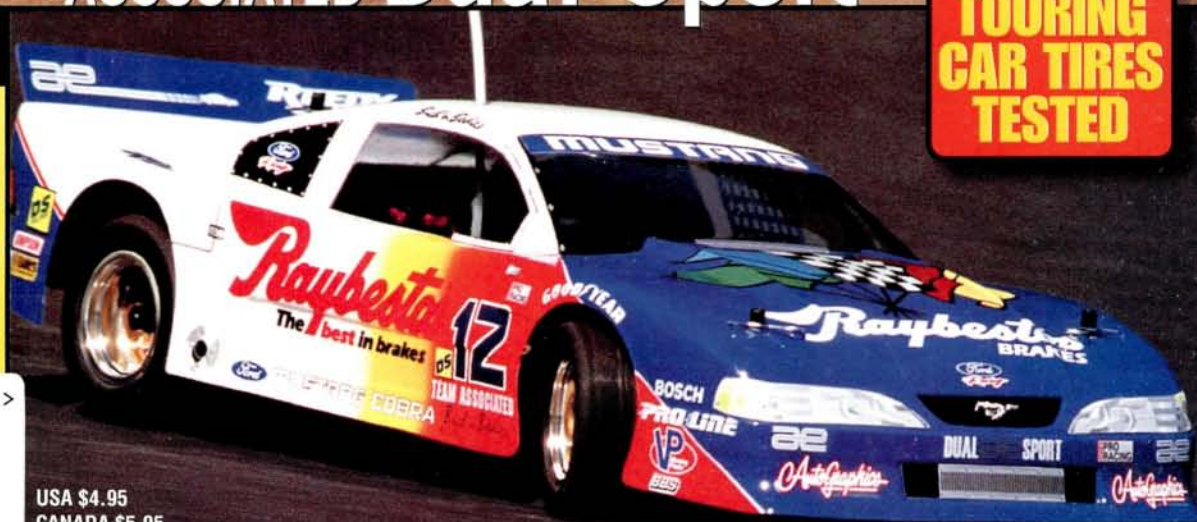
LOSI **Double-X CR**
American Made
ASSOCIATED **Dual Sport**

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TOURING
CAR TIRES
TESTED

HOW TO

TUNE YOUR
GLOW ENGINE

MAKE YOUR
BATTERIES
LAST LONGER



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CANADA \$5.95



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ON THE COVER (top to bottom): Team Losi's new Double-X4 prototype (photo by John Howell); the Team Losi Double-X 'CR' (photo by John Howell); the Associated Dual Sport (photo by Walter Sidas).

THIS PAGE (top to bottom): the Race Connection Flight Deck Race (photo by Gary Bender); touring-car tires put to the test (photo by Walter Sidas); the Team Losi Double-X4 prototype takes the ROAR Mod Nats by storm (photo by John Howell).

Radio Control CAR ACTION

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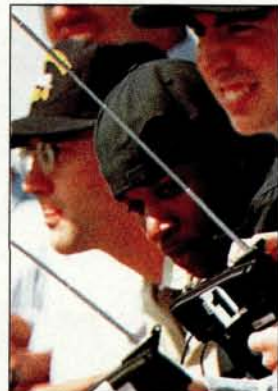
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Car Action Returns to its Square Roots

WE ALL know that the R/C car hobby is about cool goodies and high-tech gadgets (which make equally high-tech noises). Don't believe anyone who tells you otherwise. And if the number of new R/C products is an indication of the hobby's state, then it's certain that '96 will turn out to be a great year. And '97 may be even better!

You may have noticed that we've reintroduced a "square" binding. We did this to make sure that we can publish bigger issues—a necessity if we're to keep up with this crazy industry! Just look at what's in this issue: Team Associated's new parking-lot racer, the Dual Sport, adds a new twist to the familiar RC10. What's neat about this car is that you don't necessarily have to buy a complete new kit; so many of you already own an RC10 buggy that can easily (and cheaply) be turned into a Dual Sport! See George Gonzalez's review.

On the competition side, John Howell takes a look at the Double-X 'CR'—the latest from the Team Losi camp. You know how Brian Kinwald (the Jeremy McGrath of R/C off-road) has been winning every race in sight? Well, this new buggy has every factory-driver trick that Brian uses. Buying the 'CR' is like going to your local Honda dealer and getting a "works" CR250 motocrosser—which you *can't* do! I suggest that you start writing your thank-you letters to Pops Losi right now!

Those wacky Hobby Shack guys are at it again with their super-successful parking-lot series. This time, the "parking lot" was the flight deck of the U.S.S. Boxer aircraft carrier, and the eager racers were its crew! Paul "The Admiral" Bender and company have really outdone themselves with this one. They even launched a few R/C airplanes from the deck in true carrier fashion.

So many of you have asked for a definitive guide to tuning glow engines. Really, it's not such a difficult subject, but you *do* need to know the basics about how an engine works to tune it correctly. We

pleaded with our resident guru of nitro, Chris Chianelli, to impart his internal combustion wisdom, and after a few precisely placed blows to the head, he agreed. If you own a nitro vehicle or have been hesitant to buy one for fear of being unable to tune it, turn to Chris's "How To: Break In and Care For Your Glow Engine" in this issue, and all will be revealed.

As always, we welcome your letters, email and photos, for it is you who drive the ship ... steer the car ... hold the shifter ... uh ... uh ... press the buttons? You get the idea! Just keep writing!



Parking-lot racing is everywhere—even aboard Navy ships! Hobby Shack's popular race series recently boarded the LHD-4 USS Boxer—a new carrier that's nearly three football fields long! Shown from left to right are the people who made this successful event happen: Capt. Tom (he flies the Goodyear blimp, which made a low pass during the event), Capt. Moran of the USS Boxer, Kathleen Winnie from Tamiya America, Major Yarnell (the Boxer's recreation officer), Hobby Shack president Paul Bender and Rick Pike, Hobby Shack's general manager.

Frank Masi, Executive Editor

Radio Control CAR ACTION

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Rally Readers Respond!

You will never know how close I came to throwing my old Tamiya Subaru Brat into the recycling bin. Only the old-timers at Sheldon's in San Jose even remember the Brat. The parts are on their last race and not available anymore. I've reached the point where I'm afraid to drive it for fear it might break. I had just taken the salvageable parts, i.e. bearings and radio, out of it when I received the August issue of *R/C Car*

front suspension and converted forward/backward motion into left/right. I have made a replacement out of the servo-saver from my Mini Cooper. Next, I want to replace the posi rear end with the differential kit that was once available for the Brat. The rear shocks will be a simple fix; the fronts will probably be impossible. My next problem is decals. I know rally-style decals are rare, but I am a perfectionist. And I promised my coworkers that the

next car I built would be sponsored by our company, S3 Inc. We are a Silicon Valley graphics accelerator manufacturer. Our slogan is "Accelerated by S3." Do you know whether Autographics or anyone else does custom decal sheets? I

have all the artwork and can probably do the work by hand, but I have a reputation to live up to. The company has let me drive during lunch time in the big conference room on carpet, so I want to do the best job I can to create a corporate-sponsored racecar. Please respond before I change my mind and sell this Brat to some unsuspecting sap who is too lazy to build his own car.

JOHN GARRETT
jgarrett@s3.com

How 'bout it, readers?
Anyone have any leads
on Subaru Brat parts or

custom graphics? Email or write to us, and we'll pass your info along.

Frank

I am a newcomer to the R/C hobby, and I recently read your article about Frank, Doogie and George converting their old R/C buggies into rally cars. I found it very informative, and I have a question. Would it be possible to convert a stadium truck such as the Associated RC10T2 or the Kyosho Pro XRT into a rally car?
JReyno3328@aol.com

Your rally cars in the August issue ruled (the Celica especially). They looked like the cool, cartoon bubble cars. But how could someone like me with a truck or 4WD sedan turn the car into a rally such as yours? I own both types of car and would love my RC10T to become an off-road on-roader without my having to change tires and setups all the time. Please help me out of my rally rut!

J. PEDERSEN
b-idover@ix.netcom.com

Converting your 4WD sedan is easy; just add treaded tires and a rally-style body such as one of those available from Tamiya. Turning a stadium-racing truck into a rally car, however, will require the use of narrow suspension arms (to fit inside the currently available rally bodies) and buggy-size wheels and tires.

Frank

When I saw the article on rally racing, I flipped!

One of my friends has an RC10, but I'm not quite sure which one it is. I plan to trade my Super Blackfoot for it. Do all RC10s have a slipper clutch? I ask because I plan to install the Trinity Onyx in it. Where did you buy your Pro-Line Rally Hawgs? I want to use the front set, but I don't like the treads for the rears. Would any other Pro-Line tires fit the rear RC10 rims and be suitable for rally racing? Is it smart or possible to adapt the front rims to make them as wide as the rears, will the current axle be long enough to do this and, if not, could I get one?

ZACH HENDERSON
Chester, VT

Only RC10s that are equipped with the Stealth transmission have a slipper clutch (any Team car or newer RC10 has the Stealth). It's not absolutely necessary to have a slipper to run a modified motor, but a slipper does improve traction. Pro-Line's tires are available through most hobby shops; just look around. We had great success with the Rally Hawg tires, but if you want different rear tires, try any mini-pin-type tire from Pro-Line or Team Losi. Also, Losi has a tire called the Sprint that looks as if it will be an excellent rally tire. I wouldn't use wide front wheels and tires on a rally car because they would probably provide too much steering and make the car hard to drive.

Frank



Action and read the cover article. I'm so psyched about building a rally racer that I'm thinking of sinking some real dough into this classic R/C buggy.

But if Sheldon's can't find parts, who can? For starters, I need a servo-saver. If you remember, the Brat's servo-saver was mounted behind the



Errata: In Readers' Rides (October 1996), these two photos were misidentified. The Kyosho USA-1 (top) belongs to David Armstead and the ESP Clodzilla belongs to Mike McFarlin. Sorry guys!



WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

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Chris Chianelli: chriscc@airage.com
George Gonzalez: georgeg@airage.com

In search of fun
and glory, 'cause
life's too short
to be a sheep • by Chris Chianelli

INSIDE scoop



Double- X4

Team Losi—leaders in off-road racing technology—surprised everyone at the ROAR Off-Road Modified Nats in Butler, PA, when they unveiled their newest off-road racer, the Double-X4 prototype. Yes, you read right:

they're producing a four-wheel buggy! Isn't it about time that an American company made a 4WD car? Raced by the "Gold Dust twins," Brian Kinwald and Greg Hodapp, as well as by Losi's Jon Anderson, the prototype buggies are so new that our ace photographer John "Doogie" Howell was only allowed certain shots from specified angles.

So how did it do in its first outing? Well, do the two letters "TQ" mean anything to you? How about the words "win" and "big-time"? In the hands of Brian Kinwald, the car not only TQ'ed, but also went on to win its first race. Both Hodapp and Anderson also made the Main with their cars. Doogie was allowed to take a sneak peek at the cars' guts, and since he was there in person, I'll let him pass along all the info that he has at this time.



All three prototype Losi Double-X4's made it into the 4WD A-main at the ROAR Modified Nats in Butler, PA.



Top: Team Losi's Jack Johnson tries to hide the new four-wheeler from Doogie's Nikon.

Right: Team Trinity/Losi driver Brian Kinwald took the TQ position as well as the overall win—pretty impressive for the X4's first outing!



"There are two things that I can say about the

Double-X4 prototype: it accelerates like a bat out of hell, and so far, it's the only four-wheeler that I've seen that can take a jump like a 2WD buggy.

The car's suspension is awesome. It uses long suspension arms similar to the ones on the Double-X. The Losi crew doesn't want me to talk about it too much because the prototype is still in its final development stages. Here's what I can tell you though:

- ✕ The drive train is fully sealed.
- ✕ It utilizes a belt-drive system.
- ✕ Front and rear ball diffs are also enclosed (lengthens time between rebuilds).
- ✕ The motor is mounted farther forward than on other 4WD buggies.
- ✕ At this time, the chassis utilizes saddle-pack battery configurations.
- ✕ It will more than likely come with Losi's 5-spoke yellow wheels.
- ✕ The steering-servo location is incorporated into the molded drive train.
- ✕ A unique slipper assembly allows quick and easy adjustments to be made without having to remove the body.

These are just a few of the car's top features. Some cutting-edge ideas have been incorporated in its design, but if I told you about them, Pops Losi would send a team of Ninjas to assassinate me. All I can say is that it turned heads wherever it went, and I can't even begin to tell you how many people came up to me during the race to ask whether I had taken pictures of it or whether Losi had definite plans to release it to the public. As it stands now, Losi does in fact plan to release it (a target date has been set for this Spring), and we'll be showing you a more in-depth look at this wild ride in a future issue, so stay tuned!"

INSIDE scoop



Protoform's latest entry in the 4WD/FWD touring-car class is this 1/10-scale '96 C-Class Mercedes-Benz—the reigning DTM (ITC) champ. This lightweight body has good scale proportions and comes with two different wings, and the earlier version's detail has been revised. The wing stands and assembly hardware are included. It was designed to be mounted low on the Tamiya, Yokomo YR-4 and HPI RS4 (narrow) chassis to optimize handling and provide that cool "slammed-sedan" look of the full-scale ITC cars. Contact Protoform, P.O. Box 456,

Bahn-Stormer

Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.



Watch Dog on Guard

Protect your investment with the Watch Dog from PC/RC. Designed to plug into the car's receiver, the Watch Dog (pictured here in sculptor's mock-up) constantly monitors incoming signals for interference. If it detects any, the Watch Dog initiates a pre-programmed, user-selectable command to safely stop your car. When a clean signal returns, Watch Dog returns control to the driver. An LED lets you monitor status. Low-battery-voltage override is also provided. The retail price is \$39. For more information, contact PC/RC, 13807 Amlot Dr., Ste. D, St. Louis, MO 63146; (800) 646-9383; fax (314) 878-0461; Website <http://www.lwc.com/pcrc>.



TURBO REVERSE

No more DNFs!

The 500-RV Turbo is M.troniks' new budget-price reversing electronic speed control. This high-frequency controller incorporates what the manufacturer calls "linear-shutdown protection." This allows a driver to finish a run at reduced power levels, as opposed to temperature shutdown, which causes sudden and total shutdown, and that spells a dead stop. Other features include 16-turn motor

limit, simple LED setup, 12-gauge wires, TurboFets and input pulse filtering. For more information, contact Trinity Products, 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.

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TRINITY

Diesel & Dust

Long known and respected for its diesel conversions, Davis Diesel Systems now offers a conversion head for the OFNA .21. It follows the introduction of Davis Diesel's very successful diesel conversions for the O.S. .21 RFB. The other day, Bob Davis told me he thinks the OFNA offers a lot of bang for the buck, hence the decision to offer this conversion. According to Davis Diesel (and other sources of mine, I might add) the .21 conversion puts out like an aircraft .46 glow while achieving run times in the neighborhood of 16 to 18 minutes on the standard 125cc tanks! If you're tired of replacing glow plugs and feeding a thirsty glow engine that goes through fuel like a line-backer drinking Gatorade on an August afternoon, maybe it's time to give diesel a go. Oh, I almost forgot: Bob has formulated a special diesel blend for cars that's available in 1/2-gallon metal cans. Contact Davis Model Products, P.O. Box 141, Milford, CT 06460; (203) 877-1670.



TOTALLY LOADED



Nitro Pro ST

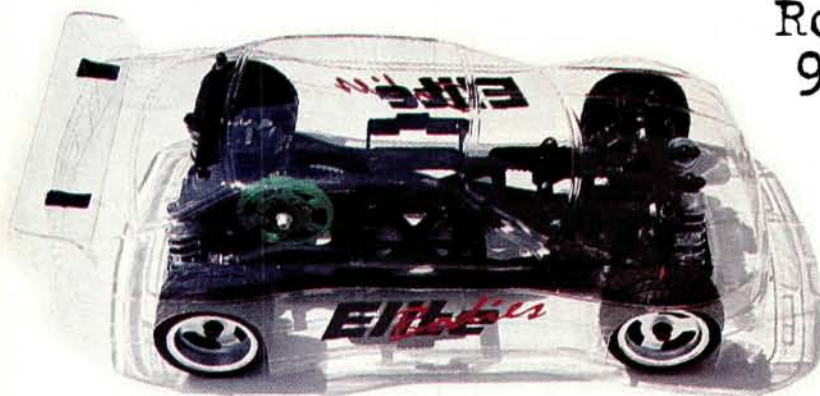
Kyosho's new Nitro Pro ST is loaded with the latest hop-ups, so it's ready to compete right out of the box. For optimum strength and durability, the front bulkhead, suspension arms and body-mounting system have all been reinforced. To improve the truck's center of balance, a special plate is included to allow the RX battery to be mounted on the rear shock tower. Other "cut no corners" high-end features include the finest oil-filled, Teflon™-coated Ultimate Shocks, a red-anodized aluminum chassis and rigid steel turnbuckles. It requires a 2-channel radio (heavy-duty servo recommended) and a .10 to .15 glow engine. Contact Kyosho/Great Planes Model Distributors, 2904 Research Rd., P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.

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Roadrunner GTO 962 Mini Sedan



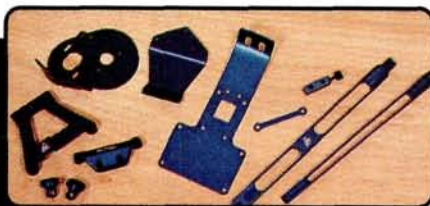
Ultimate Hobbies has just announced that they are now distributing what could be one of the most interesting parking-lot racers to come around in a long time. The Roadrunner GTO 962 is basically a 4WD touring-car chassis that has been scaled down to 1/12 scale for "M" scale. The GTO 962 features a double-deck graphite chassis, dual-belt 4WD system with front and rear ball diffs, 4-wheel independent suspension with coil-over shocks on all four corners, full ball bearings, front and rear universal-joint drive shafts and much more.

The GTO 962 chassis will accommodate most of Tamiya's M-chassis car bodies as well as the M-chassis wheels and tires. You could also deck out the GTO with one of Elite's new Mini Sedan BMW bodies like the one shown here. A Thrash Test is already scheduled on this car, so stay tuned. Unfortunately, this product is so new that pricing and part numbers are not yet available. For more information on this cool ride, call Ultimate Hobbies/GHI at (714) 921-0322.

FULL-SPECTRUM SPEED

If your favorite colors of the spectrum are blue, purple and green, you're in luck! Badd Boyz has virtually every aluminum part for the Associated RC10B2, T2 and GT available anodized in these colors. If you want to blow past the com-

petition in beautiful "flying colors," contact Badd Boyz Batteries, 1717 S. Penn, P.O. Box 83258, Oklahoma City, OK 73148; (405) 631-8833; fax (405) 631-7480; Website <http://www.baddboyz.com>.



TRINITY TRACK-WARE

Now, I can't guarantee that you'll look as great as Car Action's very pretty Susanna Silva (otherwise known as "Stunning Sue"). You can, however, look as good as you possibly can while keeping warm during the cool spring and fall race seasons with a lightweight Trinity Team 100-percent-nylon wind-breaker. Embroidered on the front are Team

Trinity GM-VIS (voltage increasing system) and Team Kinwald logos. On the back is the Trinity

Factory Racing Team logo. Available in medium, large, X-large and XX-large, they cost \$59.99.

Also available is this new black baseball cap with the purple Trinity logo embroidered on the front. It's made of soft, lightweight material, so it's perfect for summer sun protection. The adjustable cloth strap makes fitting all heads a snap, and it costs \$19.99. Contact Trinity Products, 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.



GTX Gets Big Shoes and the Stampede Gets Stung

At the NORRCA gas off-road series race no. 1 at the famous Ranch Pit Stop this year, Team Losi driver Jon Anderson dominated qualifying, and Team Losi driver Ron Rossetti won the A-Main. Both drivers had equipped their Losi GTX trucks with MIP's new 2-N-1 clutch. It's similar to MIP's 4-N-1 clutch for the Associated RC10GT, and it has a custom extension spring and large shoes made of a high-grade composite that transfer power smoothly and consistently.



Also new from MIP is the long-awaited 360 Stinger exhaust for the popular Traxxas Nitro Stampede gas truck. According to MIP, this unique tuned header system develops the tremendous low-end torque needed for off-road truck racing without sacrificing the overall top-end speed. The 360 Stinger kit comes anodized in purple and includes a sturdy custom shock tower, header hose and ties. For more information, contact MIP, 746 E. Edna Place, Covina, CA 91723; (818) 339-9008; fax (818) 966-2901.



HAWAIIAN RIDIN'

Tracy Chang's slick Traxxas Stampede has the distinct honor of traveling the terrain in Honolulu, HI. Yeah, life must be rough! Tracy highly modified his truck with a full set of ball bearings, a slipper clutch, a Tekin Rebel ESC and a Trinity Dirtinator 15-turn double. The stock body and a fade paint job that he did himself provide the finishing touches. Tracy writes that he has been into R/C monster trucks for more than 10 years, and the fun hasn't stopped!



"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 100 East Ridge, Ridgefield, CT 06877. If we choose to feature your creation, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the seventh annual "Readers' Rides of the Year Contest" in the fall of 1996. The winner will be awarded \$500 and an assortment of electronic R/C equipment furnished by Novak Electronics Inc. Our second and third choices will also receive an assortment of Novak electronic R/C equipment. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!

FLATBED FEVER

Wilson East of Hackberry, LA, boasts ownership of the "Yellow Fellow."

The '53 Ford Parma body detailed with a Parma flame kit and a basswood flatbed sit atop a Tamiya F150 4x4 chassis. This baby scoots with all six wheels turning. The dual wheel adapters were handmade, and a full ball-bearing kit has been added. It's controlled by a Futaba Magnum Sport radio system. This Southern classic is sure to make Jeff Foxworthy's kin green with envy.



AUTOBAHN CRUISE MISSILE

This Porsche kicks some serious whale-tail. Jeffrey Boffoli's 1/8-scale 911 Turbo is based on a nitro-powered 4WD OFNA HODR 1/8-scale off-road buggy. Miscellaneous mods include a ball-bearing steering kit, Bergonzoni tires with OFNA rims painted silver, an MIP On-Board Temp Gauge, a Super Force P6 engine and an OFNA 2-speed tranny. A Futaba S148 servo handles the throttle/brake chores while a Hitec 615 metal-gear servo takes care of the steering duties. Jeffrey's sweet-looking ride has a stunning Porsche body, which he got from Nitro Imports. With that .21 engine and 2-speed tranny, this car must really get up and go in a hurry!



KICK UP DIRT AND TURN LEFT

This wild creation comes to us from Mark Lonsinger of Flagtown, NJ. Mark's dirt modified started its life as a Team Losi JRX-Pro. The car has been set up with a Tekin TSC 410 ESC, a Reedy 13-turn modified motor and Pro-Line tires mounted on custom aluminum rims. It's topped off with a home-made body that Mark painted himself. According to Mark, his car gets around the track fast!



READERS' rides

DOBLE-EQUIS

Directly from Spain comes this shot of Felipe Pageo Dominguez's Team Losi Double-X. Felipe took fifth in the last regional championship that he raced in. His car is equipped with a Novak Hammer Pro and NER-3FM receiver, a Peak Performance 13-turn modified motor, Lunsford Punisher titanium turnbuckles, Team Losi Gold-compound tires (front and rear), titanium-nitride gold shock shafts and a Protoform Ripper-X body. An Airtronics CS2P and an Airtronics servo control and steer Felipe's buggy.



DIRT WEB-SLINGER

Spiderman, Spiderman, runs his Rustler wherever he can. Spins a web, hits a bump, look out folks for that double-jump—look out, here comes the Spiderman. In the still of the night...uh, anyway, you get the idea. Kevin Lum of Honolulu, HI, spun this web-crawling Traxxas Rustler our way. The truck actually belongs to his brother Rodney, who is an avid fan of the amazing wall crawler. The truck is equipped with a Traxxas XL-1 ESC with reverse, a Traxxas 2015 radio system and a Trinity 19-turn T-Tech modified motor. Kevin painted the body with Pactra racing finish paint and used a lot of carefully cut pieces of masking tape. Good job, Kevin.

THE BRACKENDALE CRUSHER

Mark den Dekker of Brackendale, British Columbia, Canada, tricked out his "Brackendale Crusher" Kyosho USA-1 with a full set of ball bearings, a Tekin Titan ESC, Kyosho Mega motors, titanium tie rods and Thorp diffs and axles. It's powered by a matched Trinity 7-cell battery pack. A Futaba radio controls Mark's beast as it cruises over the rocky ground.



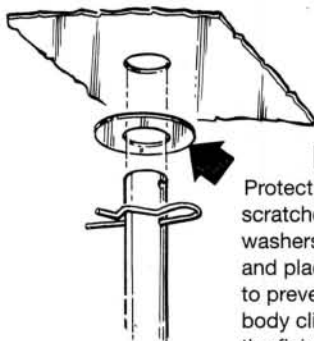
TRIO OF FUN

Chris Knight of Victoria, British Columbia, Canada, sent in this shot of his three hot-looking rigs. The Tamiya Celica and Chevy S-10 share a Novak Rooster ESC and Airtronics steering servos. The RC10T has been modified with a DuraTrax gas conversion kit, brake lights and an O.S. CZ-RX engine. All three are controlled by Airtronics Vector 2P radios.





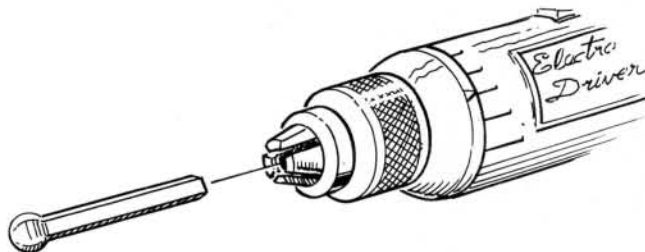
by Jim Newman



Scratch-Free Body Post

Protect your paint job from scratches by cutting large washers out of scrap Lexan and placing them as shown to prevent the supporting body clips from touching the finish.

JENS CHRISTIAN BRIXEN
Kokkedal, Denmark



Fast Allen

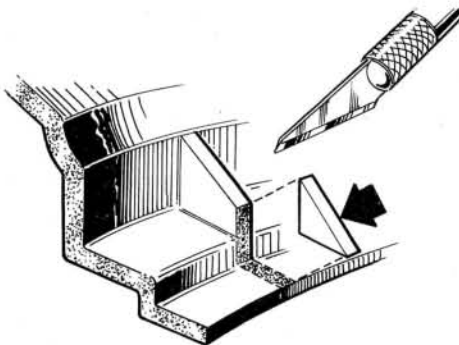
To speed up your pit and bench work, cut your Allen keys off at the bend using a Dremel grinder. Then you can insert them into a battery-powered screwdriver. Be sure to set the slipping clutch on the screwdriver so that you do not strip out the plastic.

CHRIS TOPP
Troy, OH

Losi Tires to Associated

To mount Losi X-pattern tires on Associated 3-piece rims, turn the tires inside out. Then, with a detergent-lubricated knife, slice the molded webs out of the tire edges. This will allow you to mount and seat the new tires properly.

ORONDE ARMSTRONG
St. James, West Indies



The Brush-Off

Use heat to bend old toothbrush handles to create custom brushes for various car-cleaning jobs.

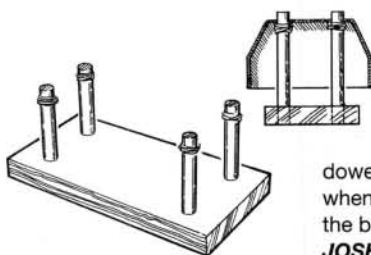
BRYAN SZYMANOSKI
Kensington, CT



Painting Jig

If you need to paint the outside of your body shell, make this jig by gluing four wooden dowels of a suitable size into a block of wood and spacing the dowels to correspond with your car's body posts. Twist rubber bands around each dowel to lift the body off the bench so that when you spray paint, the body won't stick to the bench.

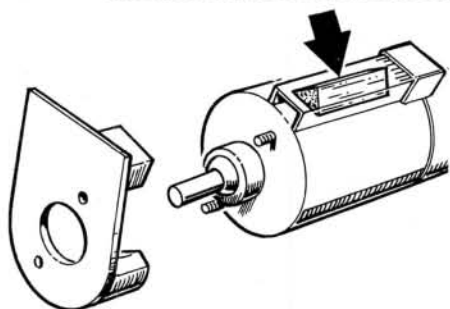
JOSHUA SHELSWELL
Parry Sound, Ontario, Canada



Hair-Trigger Starter

Sometimes, you have to squeeze hard to operate the switch on a Sullivan starter motor. Make it easier by removing the plastic end plate and slipping a small block of balsa wood (arrowed) under the rubber switch cover, then replace the end plate. Now the switch requires much less pressure, and that eases strain on the wrist.

JEFFREY YOUNG
Old Greenwich, CT



Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.



TRUBLE SHOOTING

by George M. Gonzalez

Rally Racer Woes

I read the article on converting off-road buggies into rally cars in the August issue of *Car Action*. I liked the article so much that I decided to convert my old RC10CE into an all-terrain racer. I chose a Ford Escort RS body because I liked the cool-looking rear wing. I had the body custom painted by one of the guys at my hobby shop; then I decked it out with a complete set of Tamiya Michelin Pilot Ford Escort RS decals.

I made a front bumper/body mount out of a piece of Kydex and used Bolink body mounts on the front bumper and

rear bulkhead. I also bought a complete set of Pro-Line Rally Hawgs just like the tires you guys used in the article.

Once I had finished the conversion and driven the car, I noticed that the tires had rubbed off some paint. I also noticed that the front of the body bottomed

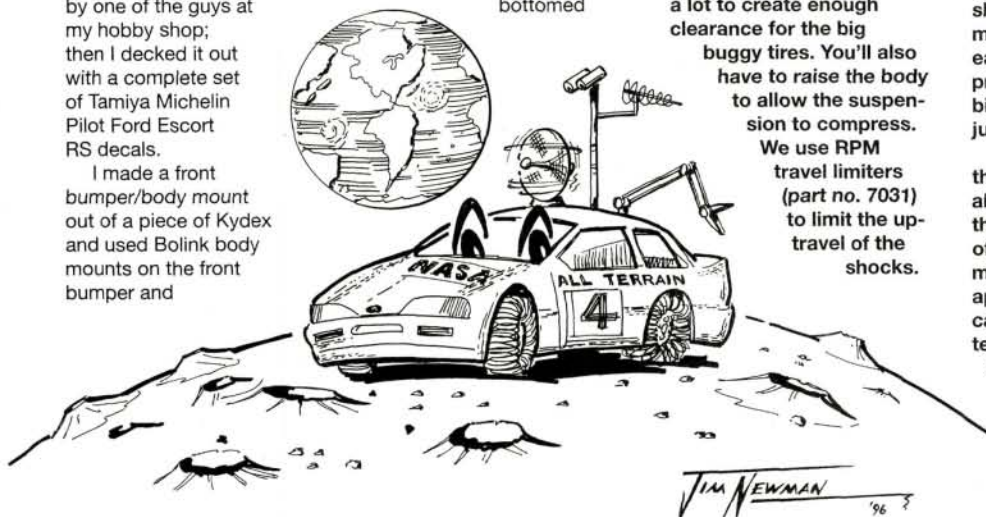
out after landing off a jump. The car also has way too much body roll. Please give me some advice on how to solve these problems.

TOM REYNALDS
Phoenix, AZ

Tom, you'll have to trim the wheel wells on the Parma Ford Escort RS body quite a lot to create enough clearance for the big buggy tires. You'll also have to raise the body to allow the suspension to compress. We use RPM travel limiters (part no. 7031) to limit the up-travel of the shocks.

These clip-on spacers snap onto the outer shock shafts. You may need as many as three spacers on each front shock shaft to prevent the tires from rubbing when landing off jumps.

You'll also have to trim the front air dam considerably so it won't scrape on the ground when landing off jumps. All this trimming might spoil the scale appearance a little, but the car will perform much better. You could remedy the excess body roll by using thicker oil and stiffer springs. Good luck and happy rallying.



Free-Wheeling Diff

I own a Tamiya Mini Cooper, which is based on the M01 chassis. Is there a proper way to build the gear diff that's supplied with the kit? When I spin one tire, the other tire spins in the opposite direction too easily (no friction whatsoever). Is this OK? I noticed that the car is a little

hard to control when I come out of the turns because it veers in the opposite direction.

JEFF DONALDSEN
Winter Haven, FL

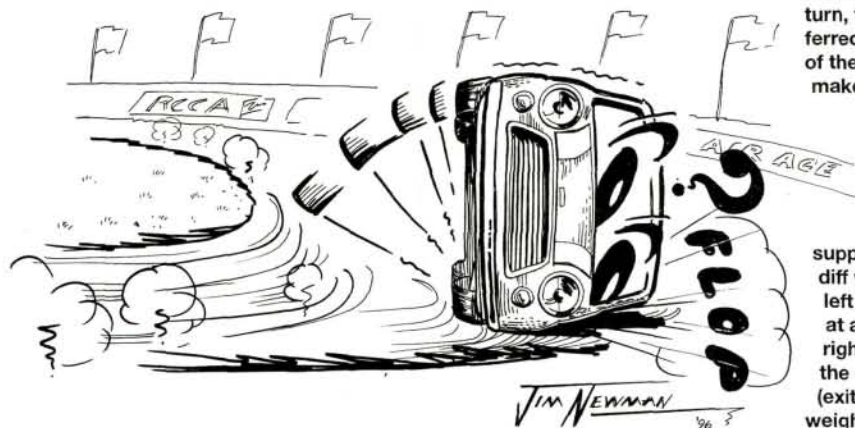
Jeff, it sounds as if your diff is set way too loose. If you spin one wheel and the

other one spins freely with no friction, your car will not handle very well. Having your diff set properly is crucial on the Mini Cooper because of its front motor, front wheel drive (FWD) configuration and because the chassis suffers from extreme body roll owing to its monoshock suspension. When your car makes a turn, the weight is transferred to the opposite side of the turn, i.e., if your car makes a left turn, most of the weight is transferred to the right front wheel.

Because the left front wheel is now unable to support a lot of weight, the diff will unload, and the left front wheel will spin at a higher rpm than the right front wheel. When the car straightens out (exits the corner), the weight is transferred back

to the left wheel that was spinning at a higher rpm. The moment the left wheel makes solid contact with the track's surface, the car veers in the opposite direction.

To remedy this, pack the gear diff with grease. The Tamiya grease that's supplied with your kit works very well. Use a liberal amount. When I build the gear diff on my Cooper, I pack the diff with grease until it seeps out the sides. This keeps the diff from unloading when the car is cornering, thus eliminating a lot of torque steer. Also, consider picking up one of Tamiya's optional M-chassis stabilizer bar kits (part no. 53239). The front and rear stabilizer bars minimize body roll, and this will greatly improve the car's handling.





by John Rist

Dynamite Power Pulse

HERE'S YOUR chance to put a little "Dynamite" in your car and blow the competition away! Horizon* has entered the electronic speed control (ESC) market with the Power Pulse—a reversing speed control with a very attractive price.

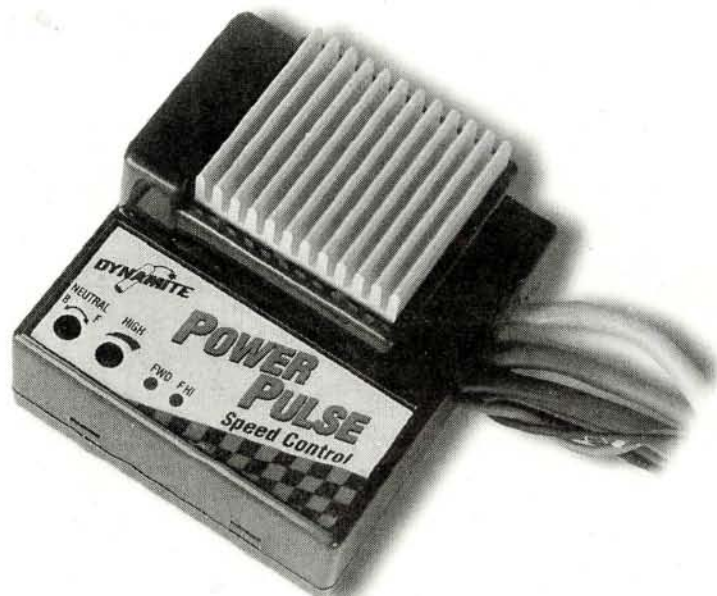
Inside, I found a full set of installed connectors and a massive heat sink; the Power Pulse is ready to run right out of the package. The comprehensive instruction sheet shows wire hook-up (the yellow wire is positive and goes to the white motor wire; the green wire is negative and goes to the blue motor wire). You could cut off the bullet connectors and hard-wire the ESC directly to the motor. Two LEDs show when the controller is

components; the metal-tab-style FETs are great for getting rid of heat, but they are also electrically hot, and this poses a problem when installing a heat sink because of the possibility of shorting. To solve this problem, there's a silicone-rubber gasket (a good electrical insulator) between the FETs and the heat sink. I found everything inside the Power Pulse to be of first quality. Given reasonable care, it should be reliable.

TEST 1—RESISTANCE

Would the Power Pulse handle the current required for killer performance? I headed to the "Scoping Out" lab to find out.

With 12 amps of current flowing, I measure



tance robs the motor of power and generates heat.

• Voltage drop along the full length of the battery wires and motor wires: 0.35 volt—a resistance of 0.029 ohm.

• Voltage drop 2 inches along the wires: 0.18 volt—a resistance of 0.015 ohm.

These readings are too high for a racing ESC, but they're pretty good for an ESC with reverse. Reversing ESCs aren't meant for racing but are primarily intended for backyard fun, fun, fun!

TEST 2—OVERHEATING

I jammed the throttle wide open and ran the ESC for 15 minutes while it pumped 18 amps. After that, the heat sink was too hot to touch, but the Power Pulse was still operating normally, and that's what counts. With normal gearing for a backyard burner (4- to 8-minute runs) and adequate cooling air, the Power Pulse should hold up well.

With regard to Horizon's claim that the Power Pulse will handle

SPECIFICATIONS

DIMENSIONS

H x W x L.....1.11x1.61x1.79 in.

WEIGHT.....2.6 oz.

TUNING

Access to controlsGood
Ease of adjustmentFair

LIST PRICE/WARRANTY\$89.95/120 days

ELECTRICAL (Mfr.'s specs)

Max. voltage.....8.4 volts
Min. voltage.....7.2 volts
Max. current forward740 amps
Continuous current forward.....370 amps
Fuse current.....40 amps
Resistance.....0.005 ohm x 2 (0.01 ohm total)

TEST PARAMETERS

Voltage.....6 volts
Current.....12 amps
Voltage drop
—along full length of wires.....0.35 volt
—2 in. along the wires.....0.18 volt
Resistance*
—along full length of wires.....0.029 ohm
—2 in. along the wires.....0.015 ohm
*Resistance = Voltage drop ÷ Current

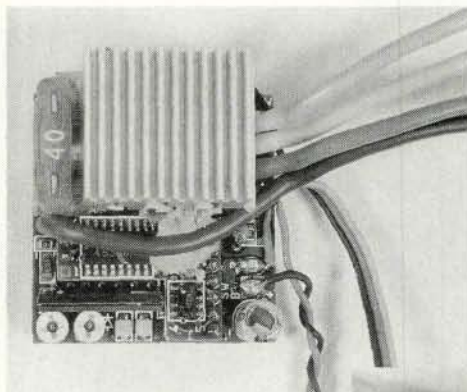
COMMENTS: Horizon's latest reversing ESC; connectors are installed; fairly low resistance; did get quite warm in a heavy truck equipped with a modified motor; never failed to function. Has a 1-second delay during which brakes are very strong. Reverse isn't blazing, but gets you out of trouble. Forward performance is great—good acceleration and good top end; trigger response very smooth over the entire speed range; a good buy.

...the Power Pulse never missed a beat, and this is all that matters.

operating in the forward mode (green) and fully on (red). This is important because an ESC with reverse has more power-handling capability in forward; in fact, many reversing ESCs, including the Power Pulse, apply only about 1/2 throttle in reverse.

The Power Pulse has a 40A, automotive-style fuse to protect against shorting, but if you ever need to replace this fuse, you'll have to open the case by removing two screws. Two printed-circuit boards hold the

the voltage drop across the ESC and then calculate its "on" resistance by dividing the measured voltage drop by 12. I measure resistance twice—along the full length of the motor wires and battery wires (including connectors) and 2 inches along them. The first reading helps me to determine an ESC's resistance as it comes from the factory, and the second gives a standard reading with which I compare ESCs. Having low resistance is important because high resis-



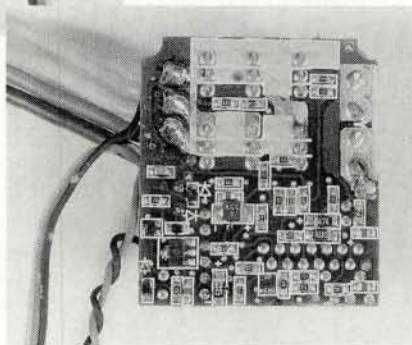
Above: when the case has been removed, you can easily see the replaceable automotive-style fuse.

Right: the Dynamite Power Pulse has the same surface-mount technology as almost every entry-level ESC on the market.

you use the same battery packs). The Power Pulse should be able to handle a 13-turn modified motor geared for a 4-minute dump time.

TEST 3— SHORTING OUT

In this test, I check to see whether the ESC could survive the heavy current it would have to with-



modified motors down to 13 turns, remember that it's run time, not motor wind, that determines how much load an ESC will be subjected to. In other words, if you gear any motor, regardless of how many winds, for a 4-minute dump, the average current will be the same (assuming that

stand if a gear jammed or the motor fried).

I plugged in a freshly charged 6-cell battery pack and jammed a piece of monster wire across the motor leads. Poof! The built-in 40A fuse blew, and the current stopped flowing. I removed the short and replaced the fuse, and the Power Pulse was up and running, having suffered no ill effects. It might be wise to keep a few spare fuses on hand (relatively inexpensive automotive type).

ROAD TIME

I read the brief instructions again and then installed the ESC in my MRC MT-10S truck. The instructions describe a three-capacitor setup (one between the two brush hoods and one from each brush hood to the motor case). Do not use a large, polarized-style capacitor (the type that has "+" or "-" marked on one end of the cap), or when you go

into reverse, the reverse voltage might blow it up. Also, never use a Schottky diode because a reversing ESC such as the Power Pulse will definitely destroy it.

When I reached the step in the instructions that describes adjusting the full-speed LED (the red one)—"Pull the trigger to full throttle and adjust the high-point pot [potentiometer] clockwise until the red LED just turns off"—I found a problem; it should read "...until the red LED just turns on." [Editor's note: Dynamite claims to have fixed this in all the new instruction manuals.] At full throttle, I could not get the red LED to turn off. It stayed lit for all positions of the pot. Full counterclockwise was a satisfactory setting; it provided full throttle as well as good control at midrange and slow throttle settings.

My truck sports a Kinwald modified motor that's geared for a 4-minute dump—an unlikely setup for a reversing ESC, but the instructions say that this is OK, so I went for it. With a 6-cell pack installed, I dropped the MRC MT-10S onto the pavement and hit the throttle. It exploded forward; acceleration was brisk, top speed was great, and run time was 4 minutes as expected.

After the run, I checked for heat; the battery and motor were quite warm and the ESC was hot—not too surprising, considering it's a budget-price, reversing ESC handling a modified motor. But the Power Pulse never missed a beat, and this is all that matters.

On the next run, I

experimented with what the Dynamite people call Breakstop Time Sharing™. This gives a 1-second delay between forward and reverse during which the Power Pulse has normal braking action. This allows wheel-sliding 180-degree turns: just jam on the brakes and go hard over on the steering. And if you get your favorite ride stuck, nose first, under a fence, reverse is available to get it out of trouble.

I next installed a 7-cell hump-back pack—a combination that proved to be wild. The Power Pulse did get quite hot, but it never stopped pumping the current to the motor. A fast truck with a modified motor and working ESC is a hard combination to beat.

CONCLUSIONS

The Power Pulse is clearly not intended for world-class competition because it's a reversing ESC, and many race rules prohibit controllers with reverse. It also has a higher resistance than you'd expect with a forward-only ESC. So why bother? The simple answer is that reverse adds realism and is fun to have.

During my tests, the Power Pulse proved that it can handle modified motors (something a mechanical controller can't do). All this, coupled with a very attractive price, puts the Power Pulse in my "best buy" category.

**Addresses are listed alphabetically in the Index of Manufacturers on page 173. ■*

WHAT IT HAS

- Full forward and reverse.
- Full set of factory-installed connectors (Tamiya-style for battery, bullet-style for motor and universal type for receiver (Futaba, JR, and Hitec receivers).
- BEC.
- Current-handling capacity large enough to handle modified motors with up to 13 turns.
- Six FETs (four for forward, two for reverse).
- Two pulse-checking LEDs (green for forward and red for full speed).
- Massive heat sink.
- Thermal-overload, reverse-polarity and fuse (40A) protection.
- Instruction sheet, three motor capacitors, servo mounting tape, cable ties, and a jewelers' screwdriver.



Improve your lap times by adding a front swaybar



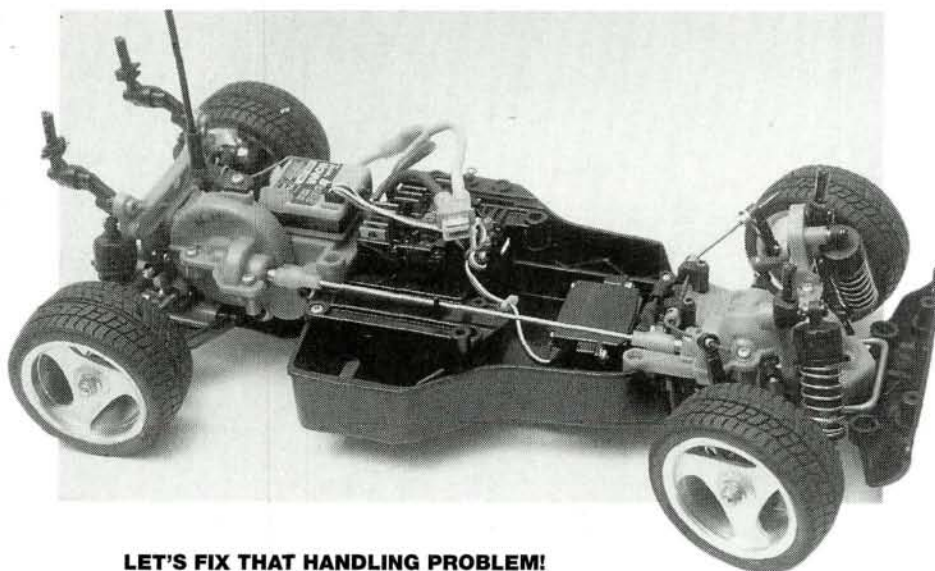
AFTER THE FIRST heat, everyone came by my pit space looking for the secret. They were certain that I had found some borderline-legal motor-tuning process or a new brand of tire or type of tread design. Maybe it was the gearing or some sort of aerodynamic aid not easily seen from the side of the track? Some of my fellow racers were pretty smooth and low-key about it, while others just came right out and asked me how come I had qualified a full lap up on the field.

This mild-mannered sedan just out-qualified the field by more than a full lap!

LATE-NIGHT INSPIRATION

My friend Brian Sohn from the Internet Usenet newsgroup rec.models.rc.land is a full-scale automobile engineer, and he contributed many useful ideas on this subject. Others were willing to share their experience with me in my quest for happy handling. Late one night, I had my Tamiya TA02 on the workbench in my secret underground laboratory, and as I pushed the suspension around, I thought about the way the wheels and upper links reacted. My wife had given me some Tamiya adjustable turnbuckle upper links for Christmas, and I had at last got around to installing them. In the process, I had removed the rear swaybar to improve access to the upper-linkage

With the body removed, you can see that it's a pretty standard TA02 sedan. I've installed adjustable upper links and a set of ball bearings, but other than the swaybar up front, it looks very ordinary.



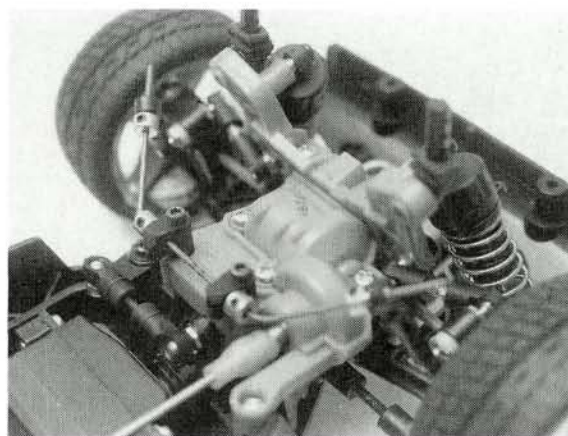
LET'S FIX THAT HANDLING PROBLEM!

In truth, I hadn't used any special tires, wings, or hidden aerodynamic assistance. I had just figured out a way to keep the rear end of my Tamiya* touring car stuck to the track and keep a flat chassis through the corners. I had installed a front swaybar!

I had never been happy with the way my touring car handled. It had waaayyy too much body roll in the turns; under acceleration in a hard, tight turn, it would pick up the inside front tire; and it had a nasty habit of spinning out when power was first

applied or when I braked hard. If I wasn't very, very careful at the start, the car would do donuts right off the line. When it accelerated out of a slow, tight turn, the rear end slid too easily to one side or the other.

To fix this, I tried every available type and brand of rear tire, and I tried different bodies, steeper rear-wing angles, gearing, shock oil and springs, a rear swaybar and a fully lowered suspension. But all I got for my trouble was a car that handled better than the other ill-handling cars out there. I knew that I could do better.



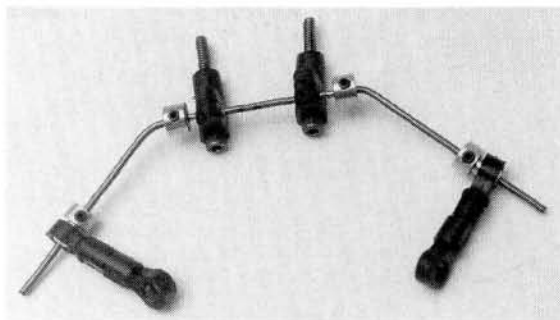
Note the swaybar mounts secured through the front transmission mounting points. No cutting or drilling is required. These are TRC swaybar mounts and ball ends, but the stock Tamiya parts fit just as well.

pivot points. In a moment of sheer inspiration, I laid the swaybar on top of the front suspension, and I saw that it would fit perfectly; if I just moved this link over here, and then added a ball end to the back end of the upper carrier...no, it needs a spacer or it will hit the wheel...and, gee, do I have socket-head screws long enough to go all the way through the mounts and into the transmission housing? Yes! My new front swaybar was born.

Why does a front swaybar make such a big difference to the car's handling? Swaybars, or anti-roll bars, are U-shaped metal bars designed to keep the chassis as flat as possible while cornering. By moving the swaybar to the front, I eliminated the negative effects of having it installed at the rear. The rear swaybar reduced rear traction and slowed reaction to small bumps and surface imperfections. With the swaybar in front, I can use any shock fluid, piston, or spring that will ensure sufficient rear traction. Up front,

the reduced steering response works to my advantage. Where I live, there is lots of dirt, dust, pollen and assorted gunk

Soon, you'll have a car that skates all over the track! Before I installed the front swaybar, I had to use 80WT shock fluid



With the swaybar off the car, you can see how simple it is. The chassis mounts in the center give the bar something to pivot on, while the links attach the bar to the front suspension.

on the parking lots. That often means poor rear traction, which makes it difficult to put a lot of power down to the pavement. Anything you can do to increase rear traction will work to your advantage. Lousy rear traction also makes it difficult to balance your car's handling, and it will reduce the front traction enough to make the car slide on all four wheels.

up front to balance handling. Now I can use 65WT with one-hole pistons. This means more precise steering (I can put the car exactly where I want it).

You'll note from the pictures that I've used TRC* ball ends on the ends of the swaybar. They allow me to increase or decrease the leverage that the suspension has on the bar's torsional spring effort. The closer the ball end is to the end of the swaybar, the more leverage the suspension has and the softer its action will be. If I move the ball end closer to the pivot point of the swaybar, the suspension action is stiffer and more immediate.

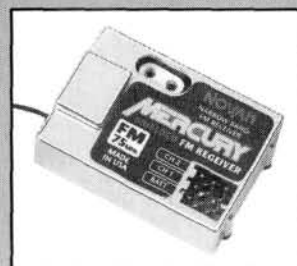
HOW DOES IT WORK?

The center of the bar is held firmly on the chassis by a pair of pivot mounts that allow the bar to move freely up and down, and this minimizes unwanted additional spring resistance. Links attach the ends of the bar to the suspension

continued on page 167



FLASH OF BRILLIANCE



The ALL NEW Novak Mercury Shielded FM Receiver has been spotted and is heading towards your local hobby store! Witnesses claim it has taken their R/C world into a new galaxy!

A Star is Born!

First spotted at the 1996 IFMAR World Championships in California, the Novak **Mercury Shielded FM Receiver** is truly a sight to behold.

A micro-receiver for R/C surface models, the Mercury operates on a narrow band that is not affected by signals 10 kHz away! With dimension of 1.10 x 1.54 x 0.47 inches and 0.48 ounces, the Mercury is easily one of the **smallest and lightest receivers** on the market.

The Mercury's superior Adjacent Channel Rejection allows for usability with all the odd and even channels on 75 and 27 MHz frequencies. A **low voltage operation** (down to 3.0 volts DC) and **Solid State RVP™** (Reverse Voltage Protection) makes this star bright and tough.

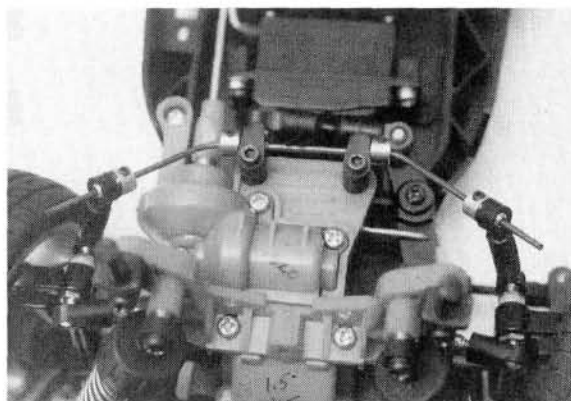
Shield Yourself!

The Mercury is the R/C car industry's first Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI) protected receiver, made possible with Novak's **Chrome-Shield Protection™**. Chrome-Shielding is the result of a metalizing process that deposits a thin layer of highly conductive metal directly onto the plastic case, providing the Mercury with superior noise attenuation without the added weight. The chrome case also increases the receiver's immunity to radio noise, protects against interfering signals, and blocks noise coming from the chassis, motor, battery, speed control, and servo.

The Mercury FM Receiver, taking your R/C world into a new galaxy!

NOVAK ELECTRONICS, INC.
18910 Teller Avenue, Irvine, CA 92612
• (714) 833-8873 •

Advertisement



Notice how easy it was to mount the bar linkage on the upper end of the hub carriers with some Tamiya ball ends. The bar and vertical linkage are from their rear-swaybar kit. Note the numbers I've written on the tranny case and front shock tower to help me remember what I've installed: .0620 is the swaybar diameter; 1.5 the camber-degree setting; and 1/65 means one-hole piston, 65WT shock fluid.



YOKOMO YZ-10 Worlds Car

by Greg Vogel

YOKOMO* YZ-10...enough said! Oh, you want to hear more. Let me warn you, what you are about to read about can be addictive. As of now, there are no therapy groups for this, so be careful! Yokomo has introduced a World Championship-based YZ-10. After extensive testing of a prototype chassis, it was produced and included in the YZ-10 kit along with Team Associated* shocks, an improved center pulley and more. Yokomo essentially took Mark Pavidis's IFMAR World Championship-winning car and boxed it up. Now it's *your* turn to win the races.

KIT FEATURES

- **Chassis.** Yokomo has included a new chassis in the world champion special. If you flip back through your stack of back issues of *R/C Car Action* and pull out the

January '96 issue, you can take a look at Pavidis's World Championship-winning YZ-10. He used the prototype chassis. The graphite chassis has been "Swiss-cheesed" to reduce weight, but at the same time, the holes were positioned to avoid losing strength.

Along with being super-light, the batteries were moved more toward the center of the car. The battery configuration will allow you to use up to a 7-cell saddle battery pack, and the pack is held down with graphite braces. In the front of the chassis there is a 10-degree kick-up. A kick-up on a 4WD chassis is a relatively new concept and has positive effects on the car's handling—especially on bumpy, "jumpy" tracks. The graphite upper brace is strong, light and slotted to allow the belt tension to be changed with the aid of an adjustable tie rod.

- **Drive system.** The YZ-10 uses a pulley system that is slightly different from that on Yokomo's older cars. The rear ball differential uses a 33-tooth pulley with steel outdrives and is housed in a nylon composite case. The steel outdrives have been cut in the center to save weight. The center drive is another upgrade from the older YZ-10. The spur gear is attached to an aluminum pulley that drives a belt to the rear. At first, I was disappointed that Yokomo did not include a slipper clutch like the one on Pavidis's car, but I was told that Pavidis had his slipper clutch disengaged, and most of the other Yokomo drivers remove the slipper clutch to save weight. An optional slipper clutch is available from Yokomo. A new aluminum one-way pulley drives the long belt to the 33-tooth front pulley. The center drive mounts on an aluminum

PHOTOS BY JOHN HOWELL AND WALTER SIDAS

Testing the IFMAR 4WD

WORLD CHAMP

SPECIFICATIONS

SCALE 1/10
LIST PRICE \$650

DIMENSIONS

Length overall 14.25 in.
Wheelbase 10.75 in.
Width (F/R) 9.25 in.

WEIGHT 58.5 oz.

CHASSIS

Type Flat plate with 10-degree front kick-up
Material Graphite

DRIVE TRAIN

Type (F/R) Pinion/spur
Transmission Universal axles
Differentials (F/R) Ball
Slipper clutch None
Bearings/bushings Ball bearings

SUSPENSION (F/R)

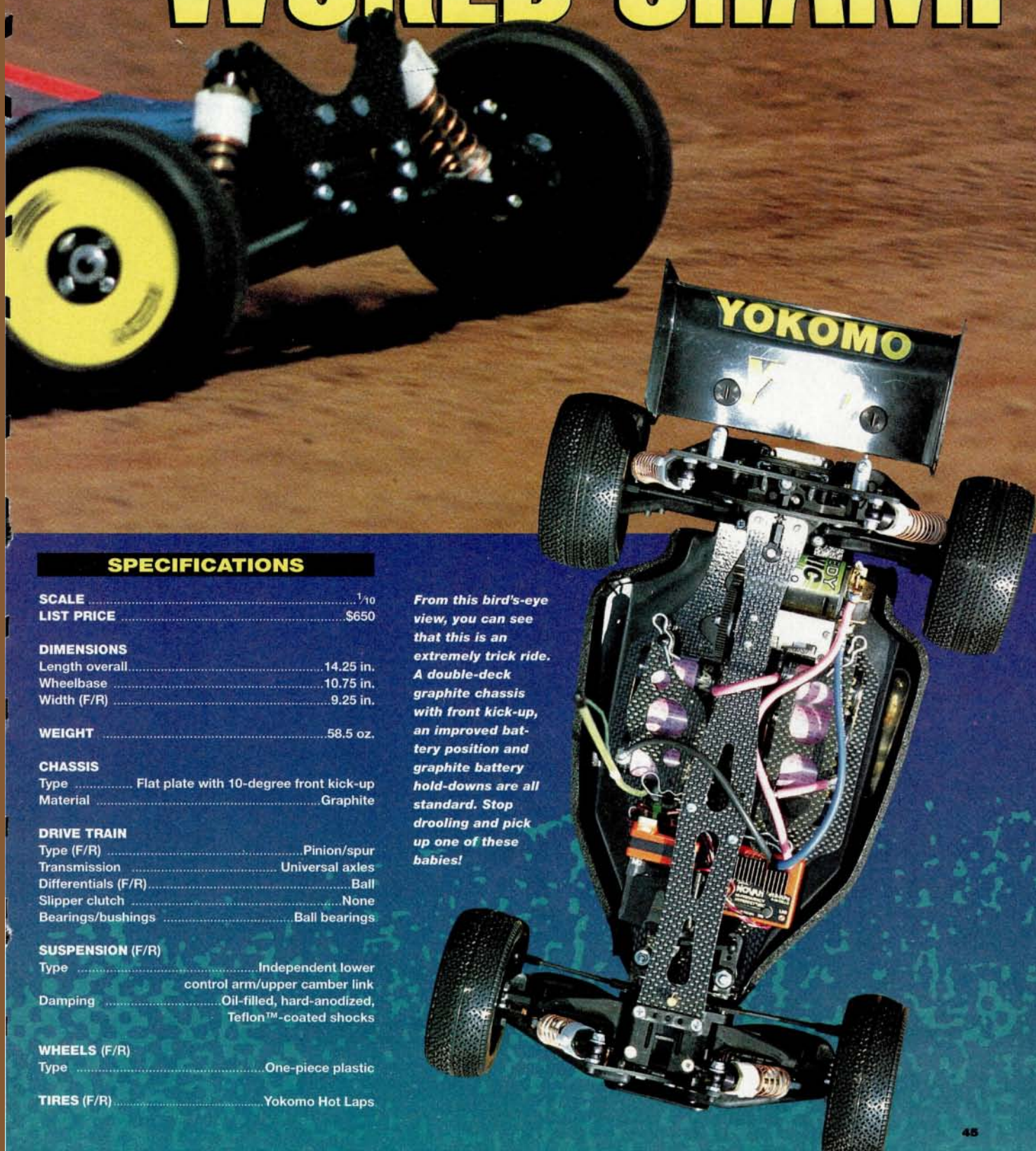
Type Independent lower
control arm/upper camber link
Damping Oil-filled, hard-anodized,
Teflon™-coated shocks

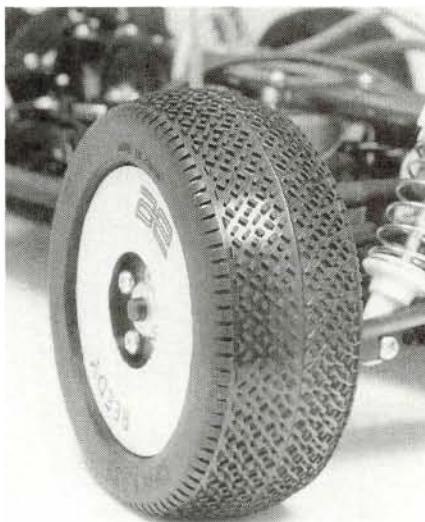
WHEELS (F/R)

Type One-piece plastic

TIRES (F/R) Yokomo Hot Laps

From this bird's-eye view, you can see that this is an extremely trick ride. A double-deck graphite chassis with front kick-up, an improved battery position and graphite battery hold-downs are all standard. Stop drooling and pick up one of these babies!





Yokomo Hot Laps tires are included in the kit. These tires are well-suited to both damp and dry, hard-packed conditions. Check out the Associated wheel disks—pretty trick!



LIKES

- Lightweight graphite chassis with front kick-up.
- Excellent performance on rough tracks.
- Top-quality parts that fit perfectly.



DISLIKES

- Instructions could be better.
- Tires don't work on many track surfaces.
- High price.

Building & Setup Tips



• Use medium-grade Loctite on the screws that go into metal parts. I did not use Loctite the first time, and the screws in the steering posts, the small screws that hold the nylon piece over the center shaft and the motor-mount screws loosened.

• Check the belt tension before you run the car. I ran it with the recommended tie-rod tension, and it was too

loose, so the belt skipped.

• Diff grease is not included. I used Team Associated black grease on the thrust bearing and Stealth grease on the diff balls.

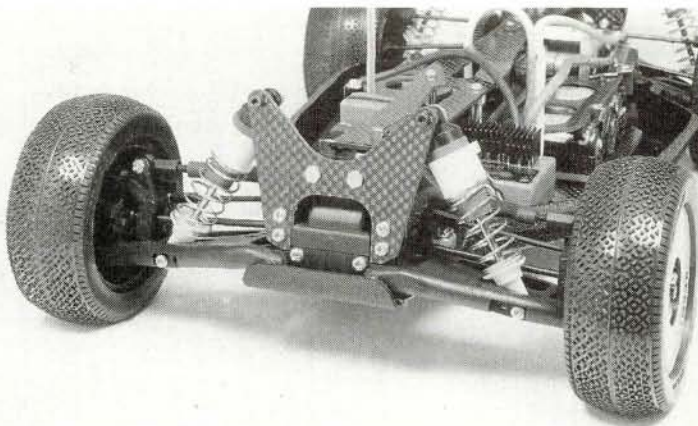
• File the battery slots so that the battery will sit a little lower in the chassis. This will also take off the slot's sharp edges, so the chassis will not cut into the battery shrink-wrap.

• Use RCPS® Green Silme on the shock seals to improve their seal and smoothness.

• During maintenance work, clean the outdrive bearings well. If the bearings are not dirt-free, they are more apt to seize.

• Check all camber and steering rods after assembly. The suggested settings are not correct. Start with 0-degrees of negative camber and adjust from there, to suit track conditions.

Super-rigid suspension-arm components, graphite shock tower, Team Associated hard-anodized shocks, universal dogbones and a special kick-up round off this world-class front suspension.



motor mount. The front ball-differential pulley has been narrowed to accept the longer suspension arms. Like the rear diff, it's mounted in a nylon composite case.

• **Steering.** The bellcrank system is similar to that on all of Yokomo's cars. The main bellcrank has a built-in, adjustable servo-saver. A steel wire with two Z-bends connects the bellcranks. On the main bellcrank there are four holes to adjust the steering throw. Though a brace for the top of the bellcranks is not included, it would benefit the steering by increasing its rigidity.

• **Front suspension.** To accommodate the kick-up on the front of the chassis, the nylon composite arms have been bent downward to avoid reducing suspension travel. The lower suspension arms (wishbones) are extremely rigid and were designed to improve handling on bumpier tracks. A molded upper wishbone has an adjustable ball end that's

THINGS YOU'LL NEED

- 2-channel radio system with a high-torque steering servo.
- 6- or 7-cell saddle battery pack.
- Battery charger.
- Motor.
- Tools.
- ESC.



Factory Options

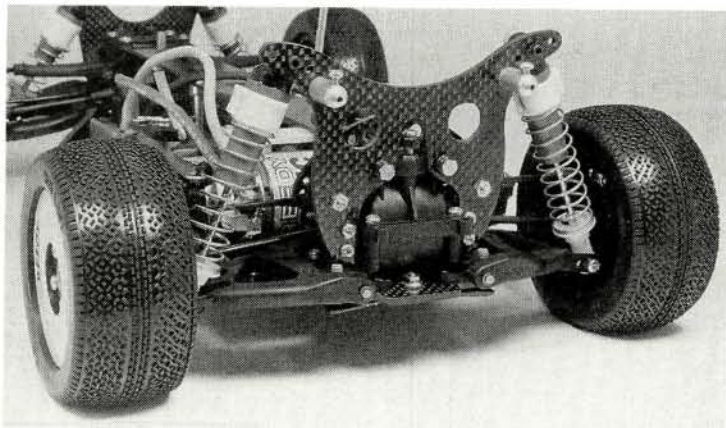
- Slipper clutch—part no. ZC-670C.

attached to the hub carrier to allow camber adjustment. The upper wishbone is attached to the top of the differential case instead of the shock tower. The front shock tower is made of graphite and has only one shock position. Yokomo must have

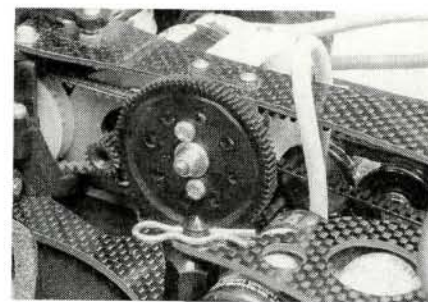
done extensive tests to find the perfect shock location. For the champion special Yokomo included hard-anodized, Teflon™-coated 1.02 Team Associated shocks similar to those on all the cars of the Team Yokomo drivers. The shocks



Scot Bich from Bich'n Bodies did an outstanding job painting this body. He even painted the Lexan undertray, which is a good thing 'cause now my car looks good even when it's on its lid!



In the rear, you'll find the top-of-the-line stuff that's featured up front. Hey, what do you expect? This is the World Champion.



Check out the twin belt setup. Two high-quality ball diffs are standard; no slipper, but one is available. Most team drivers don't use one, and after running the car, I don't think I'll buy one either; there's no need.

include number-1 shock pistons and Yokomo's copper springs. My only gripe is that the kit doesn't include Associated pure silicone shock fluid, but rather the old synthetic stuff.

• **Rear suspension.** Like the front-suspension arms, the rear arms have been bent downward to increase suspension travel and are also made of a lightweight nylon composite made even lighter, having been milled out in strategic areas. There are two holes in the arm to allow shock adjustments. The rear hub carriers are equipped with two hinge pin holes that allow you to raise or lower the hub. Team Associated 1.32-stroke shocks are included, along with Yokomo copper springs for the rear suspension. Like the front one, the rear shock tower is lightweight graphite with three holes for shock-mounting positions. Because graphite is stiff, it does not flex much.

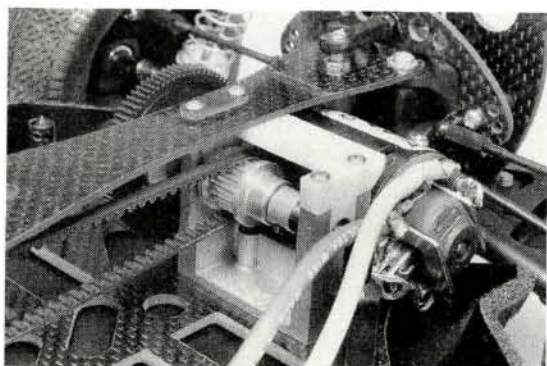
fast standing still, and Scott even painted the Lexan undertray to match the body—pretty bich'n! Unfortunately, my kit didn't come with a wing, so I picked up a molded black wing (made by Yokomo) from Team Associated.

The tires are the very low-profile Yokomo Hot Laps—the same tires that

headed to my favorite race track, R/C Madness in Enfield, CT. When I pulled into the parking lot and saw the track, I thought about turning around and going home with my tricked-out car. Crazy Chris Marcy, the owner, still had the "supercross" layout set up from the previous week of racing. The track consisted of

THE COMPETITION	YOKOMO YZ-10 WORLDS	SCHUMACHER CAT 2000 E.C.	TENTH TECHNOLOGY PREDATOR INTL. TEAM CAR
	Wheelbase	10.75 in.	11 in.
	Width	9.255 in.	9.5 in.
	Weight	3 lb., 10.5 oz.	3 lb., 6 oz.
	Diff type	Ball	Ball
	Chassis	Graphite	Fiberglass
	Price	\$650	\$529.50
	Available at*	\$450	\$329.95
	Issue reviewed	11/96	12/95
			9/96

*Prices vary with location.



A lightweight center pulley with a trick one-way unit is standard—an expensive option in the past.

On a 4WD car, the parts most susceptible to breakage are the shock towers. Since the towers are graphite and flex very little, Yokomo incorporated rubber O-rings on the top hex-mounting screws to absorb impacts.

• **Body and tires.** A sleek, low-profile body is included in the kit. I would like to thank Scott Bich from Bich'n Bodies for an excellent paint job. The car looks

the Yokomo drivers used at the World Championships when the track was damp and loamy. They also work well on dry, hard-packed clay surfaces. Black nylon wheels are included, and I stuck on some Team Associated wheel disks to trick the car out.

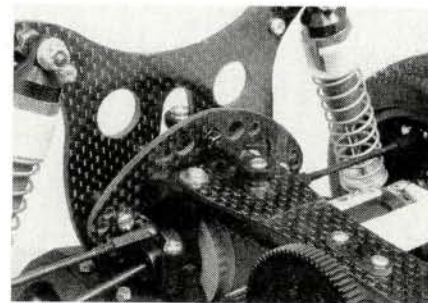
TEST GEAR

I pulled the radio equipment out of my Yokomo '93 Works. My steering servo is an Airtronics* 94151 high-speed servo. A Novak* NER-3FM receiver is used because it's small, and a Novak 410-HPc

speed control sends the power to the Reedy* Sonic motor. A New Wave matched 6-cell battery pack provides the juice, and the car is controlled by a JR Propo* R756 radio.

PERFORMANCE

After I had built this incredible race machine, I really didn't want to run it. It looked too nice to get dirty, but I had to do it. I charged up some batteries and



A tie rod is mounted between the rear bulkhead and the graphite top plate. This allows subtle adjustments in belt tension. Check out all the graphite goodies.

two, 3-foot jumps with steep takeoffs, a triple section with jumps measuring up to 1 foot, a 1-foot drop-off in the sweeper, a huge mogul section and more (believe it or not). I knew that any of my older 4WD cars would never be able to survive this track.

But I had to test the YZ-10 because of my approaching deadline. I set it up on the starting grid, got on the stand and hit the throttle. The car took off with amazing acceleration. Through the first set of

(Continued on page 168)



TEAM LOSI Double-X 'CR'

by John Howell

I'LL GET straight to the point: Team Losi's* new Double-X 'CR' is the result of considerable research and development. The buggy includes a slew of noteworthy features (most important, a newly designed rear end) that greatly enhance the buggy's already admirable on-track performance. The Double-X 'CR' is as close to being a factory ride as you can get. By now, most off-road racers should be familiar with the Double-X, so I'll focus on the new buggy's highlights.

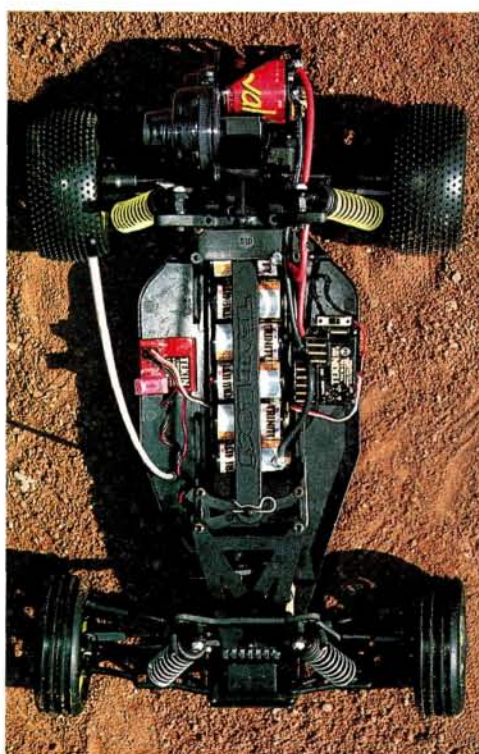
KIT FEATURES

- **3-degree toe-in rear end.** The biggest, most instrumental change that you'll find incorporated into the 'CR' design is the new 3-degree rear end. The older-style Double X's rear end incorporated 3 degrees of toe-in directly into the hubs. The 'CR' rear end uses a new 3-degree pivot block and the toe-in is incorporated into it. (The hubs are now 0 degrees instead of 3.) The pivot block is separate from the bottom plate, and it will be available with zero anti-squat (standard) or 2 degrees (optional).

At this point, you're probably asking yourself, "What's the difference? They both have 3 degrees of toe-in." Well, there's a big difference. By placing the toe-in at the pivot block instead of in the hubs, the engineers at Team Losi discovered that the car has much more traction coming out of corners, and that it is much more stable when braking. Racers comment that they feel as though the car has more steering because of the added stability and the way the rear end hooks up.

Also new to the rear end are redesigned suspension arms which feature two shock-positioning holes (one of which is the "factory" hole that most racers had to make by drilling out the arm themselves.)

- **25-degree carriers and spindles.** One of the first mods most racers made to their Double-X was to add Losi's optional 25-degree carriers and spindles to enhance the car's steering ability. They are standard in the 'CR' kit. The new carriers are an updated version of the older units; they have an additional hole for the camber location (for a total of two), and this new hole has proven to be the choice of all the factory drivers.



PHOTOS BY JOHN HOWELL

S P E C I F

SCALE 1/10
LIST PRICE \$349.95

DIMENSIONS

Length overall 15 in.
Wheelbase 10.625 in.
Width (F/R) 9.625/9.875 in.

WEIGHT (gross, RTR) 3 lb., 8.5 oz.

CHASSIS

Type Three-piece modular "G-tunnel"
Material Stiffezell composite

Team Losi's Double-X 'CR' is more race-ready out of the box than its predecessor. A few years' worth of research and development and input from Losi's top drivers helped them bring their best endeavor to the masses.

The car is nearly perfect in all aspects. If you want to seriously get into off-road racing, you must give this car a look-over.



FULL-FLEDGED FACTORY RIDE!

ACTIONS

DRIVE TRAIN

Type.....	Sealed gearbox (2.19:1 reduction)
Primary.....	Pinion/spur
Transmission.....	Universal-joint drive shafts
Differential(s).....	Adjustable ball
Slipper clutch.....	Hydra Drive/friction slipper
Bearings/bushings.....	Bearings

SUSPENSION (F/R)

Type.....	Independent A-arm w/upper camber link
Damping.....	Oil-filled, hard-anodized shocks

WHEELS (F/R)

Type.....	5-spoke, one-piece plastic
Dimensions (DxW)	
—Front.....	2.1x0.75
—Rear.....	2.2x1.625

TIRES

Front.....	Wide Body (Gold compound)
Rear.....	IFMAR Pin (Silver compound)

ELECTRICS

Motor, battery, ESC.....	Not included
--------------------------	--------------

• **Tires.** Recognizing that, more than likely, nine out of 10 racers replaced the original buggy's HT front and Gold-compound rear tires with stickier Silver-compound rears and Wide Body Gold fronts when they opened the kit, Team Losi has included the preferred softer-compound tires as standard issue in each 'CR' kit.

• **Wheels.** Included with the 'CR' are Losi's 5-spoke design wheels. When I go to a track, most every Losi buggy I see is sportin' the 5-spokes, so I'm assuming that the Losi crew recognized the same occurrence and decided to add them to the kit.

• **Front-suspension arms**—revised arms have holes that accept Losi's optional front-swaybar kit.

• **Battery strap.** An all-new, lightweight, molded strap replaces the standard Velcro®-brand fasteners and holds the batteries in place more firmly.

• **New body and V-wing.** The engineers at Team Losi developed a new, low-profile body to style out this new rig. Also new is a V-wing that increases downforce and aids rear traction.

• **New springs.** To take full advantage of the new softer-compound tires, spring rates have been optimized for the new suspension parts. The original Red rear springs (2.6 rate) have been replaced by softer Yellow springs (2.0 rate), and the original front Green springs (3.5 rate) have been replaced by softer Silver springs (3.2 rate).

The 'CR' also retains the same winning equipment that the original Double-X incorporated into its design such as the Hydra Drive traction-control system, Hard Body hard-anodized shocks, modular Losi G-tunnel chassis design, and the same lay-down three-gear transmission with the same overall ratio (2.19:1).

TEST EQUIPMENT

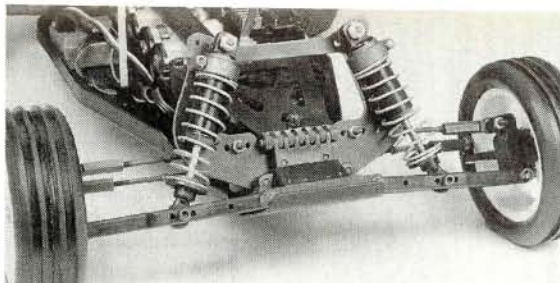
The 'CR' was set up with the following equipment:

- Airtronics* Caliber 3Ps.
- Tekin* TFM 27MHz receiver.
- Tekin TSC G-12c ESC.
- Airtronics 94155 servo.
- Trinity* Kinwald Dirtinator 13-Triple (Mod class).
- Trinity Midnight (Stock class).
- Trinity 30A World Tech 1700 SCRC cells.
- Bodywork by Bich'n Bodies* (thanks for the great job, Scot!)

PERFORMANCE

To best evaluate the CR's performance, Frank, George and I all agreed that we should pass the car along to local contributing author Derek Buono. Derek has been racing the Double-X since its inception back in '93, and we felt that he would be able to accurately convey the differences between the two machines. Take it away, Derek!

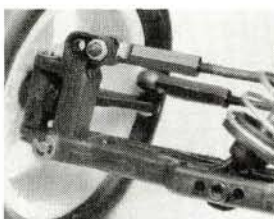
A company can make changes to a car until they're blue in the face, but if it doesn't make a difference on the track, it's a wasted effort. Fortunately for Team Losi, their new Double-X 'CR' performs better than any buggy I've ever driven. My previous Double-X had all the toys, but even on its best day, I can't recall it handling as well as the new 'CR.' It is a well-known fact to off-road racers that the Double-X excels on rough tracks. The 'CR' takes this one step further. I set up the car on the stiff side (see setup sidebar) and it was still smoother than any buggy on the track.



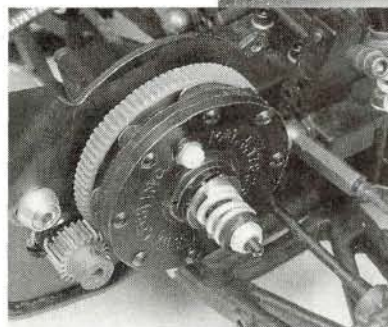
Up front, you'll find Gold-compound wide-body tires, Silver shock springs, 25-degree carriers and spindles and new suspension arms that will accept an optional front swaybar.



A new battery strap helps keep the cells positioned firmly in place.



The 25-degree carriers and spindles have been slightly modified from their previous design. A new camber-link hole has been added (for a total of two).



In the rear, you'll find new additions such as Silver-compound IFMAR pin tires, Yellow shock springs and, of course, the newly designed 3-degree toe-in.

As with all of Losi's full-blown racing kits, the Hydra Drive is standard.

I tested the 'CR' over several days at JP's Hobby Center in Seymour, CT, where track maintenance is treated like the Black Death, so you can imagine the track conditions. The first day of racing was stock, so I fired in my Trinity Midnight stock motor and a set of matched Trinity World Tech 1700 SCRC cells and pulled up to

the line. I rarely practice, and this day was no different.

During the first lap, I was instantly impressed by how the car soaked up all the surface bumps and jumps, and the Midnight provided all the power I needed to kick up some dirt. I can't remember the last time I raced stock buggy, and my

Building & Setup Tips



As always, Losi is a leader in quality, and the new 'CR' lives up to Losi's standards. The instructions are second to none, so there is little difficulty during building for even a novice. Like any kit, there are some sticky spots that require extra attention to ensure maximum performance. Here's what I found as I went through the building process.

• It is tempting to build the car strictly using the pictures, but resist this if you can, and read the text; it is very helpful at times. Open each bag as specified in the instructions. So you don't have to hunt through any additional bags, Losi has gone to the trouble of putting the parts for each step together in a particular bag.

• I hope I am not the only person on the planet who dislikes threading tie rods together. I question why Losi has gone to the smaller design. I used the supplied wrench to grab the hex, and then with a good pair of pliers, I held the plastic ball cups and turned the Losi wrench to tighten them. This is the easiest way to put these headache-makers together without using aftermarket tools.

• I run my batteries centered in the middle of the battery tray, and because I don't run connectors I had a problem with battery bar clearance around the rear bulkhead with my solder point. To remedy this minor glitch, I broke out my trusty Dremel tool and slightly grooved out a semi-circle on the left side of the bulkhead. This allowed proper clearance for the battery tab to slide back a little farther, and I soldered the without trouble.

'CR' SETUP

Steering Ackerman	Standard position
Motor type	Midnight, 13-turn triple Kinwald
Gear ratio (pinion/spur)	25/81 (stock), 23/81 (modified)
Slipper setting	Medium
Rear ride height	Universals parallel with ground
Front ride height	Arms parallel with front kick-up
Battery type	Trinity World Tech 6-cell, 1700mAh SCRC
Battery position	Middle
Springs (F/R)	Silver/Yellow
Travel limiter (F/R)	None/"A" spacer inside, "B" outside
Shock oil (F/R)	30WT
Shock pistons (F/R)	57/56
Front toe-in	0 degrees
Rear toe-in	3 degrees each side (at pivot support)
Front caster angle	25 degrees
Camber (F/R)	-2 degrees
Rear hub spacer	1 spacer on each side of hub (middle)
Shock positions (top/bottom)	
—Front	Third hole in/middle hole
—Rear	Third hole in/inner hole

• I went out on a limb and put an additional piece of battery foam on the bottom of the battery tray, but this caused a clearance problem with the new battery brace. Again, I modified the bulkhead slightly with my trusty Dremel tool. This time, I

made a small groove underneath the top of the battery cup to allow the brace to fit and be 1/16 inch higher. After that, the brace fit perfectly.

NEW!



Introducing...

WATCH DOG

Get rid of glitches and runaway, and protect your investment.

Beware of the signal thief. Protect your investment with PC/RC Products' new Watch Dog. It is an on-board signal monitor that keeps your car on the road and out of trouble. The Watch Dog is designed to plug into any AM or FM receiver. The Watch Dog constantly monitors the signal coming to the receiver and when trouble strikes, the Watch Dog will take over and protect your vehicle by executing a pre-programmed user-selectable command to safely stop your car. When the signal returns Watch Dog will automatically return you to the driver's seat. The unit has an LED that lets you know what happened.

The Watch Dog is like having the convenience of a PCM radio without the price. The Watch Dog will retail for approximately \$39.00. For more information, check us out on-line at: <http://www.iwc.com/pcrc>.



PC/RC
Products

1-800-646-9383

Check us out at: <http://www.iwc.com/pcrc>

THINGS YOU'LL NEED

- 2-channel radio system.
- Steering servo with at least 40 oz.-in. of torque.
- 6- or 7-cell battery pack (in stick or side-by-side configuration; hump packs won't fit).
- Basic hand tools, e.g., Phillips and flat-head screwdrivers, pliers.
- Paint for Lexan body.
- 05-size electric motor.
- 48-pitch pinion gear.
- Battery charger.
- ESC.
- Slider conversion kit—A-3094.



Factory Options

- 2-degree rear pivot block—part no. A-2113.
- Graphite composite rear arms—A-9802.
- Graphite composite rear pivot plate—A-9830.
- Graphite composite battery hold-down strap—A-9907.
- Graphite composite front arms—A-9701.
- Graphite composite rear shock tower—A-9813.
- Graphite composite chassis—A-9902.
- Lightweight machined motor plate—A-9920.
- Aluminum dogbone—A-9924.
- Aluminum top shaft/gear—A-9930.
- Aluminum hardcoated suspension balls—A-9940.
- Rear-axle bearing spacer/thrust-washer set—A-9941.
- Titanium-nitride shock shafts—A-5060 (0.6 in.)
- Titanium-nitride shock shafts—A-5062 (1.2 in.)

THE COMPETITION

	Kyosho Pro-X	Team Losi Double-X 'CR'	Associated RC10B2	Schumacher Cougar 2000
Wheelbase	10.5 in.	10.625 in.	10.375 in.	10.75 in.
Width (F/R)	9.3 in.	9.625 in./9.875 in.	9.875 in./9.75 in.	9.5 in.
Weight	3 lb., 8.5 oz.	3 lb., 8.5 oz.	3 lb., 6.3 oz.	3 lb., 2.26 oz.
Diff type	Ball	Ball	Ball	Ball
Chassis	Kelron	Stiffezell	Composite/aluminum	Fiberglass/plastic
List price	\$249.99	\$349.95	\$340	\$349.50
Available at*	\$99.99	\$189.99	\$179.99	\$221.70
Reviewed in	2/95**	11/96	5/96	2/95**

*Prices vary with location.

**see February '95, "2WD Buggy Guide"



LIKES

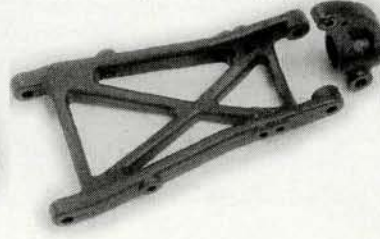
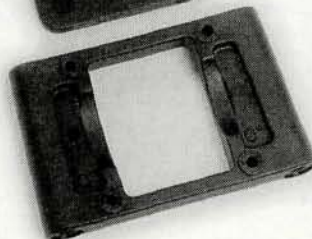
- The steering. You point in the direction you want to go and there isn't a hint of push.
- The quality of the parts and construction is second-to-none.
- Ready to win right out of the box. Some simple fine-tuning, and "TQ" will be your middle name.



DISLIKES

- The hex on the tie rods is too small. The old ones were much better.
- Hard to find wrong in near perfection.

The newly designed 3-degree-toe-in rear end features a new pivot block (the toe-in has been built into this block, not the hubs), a separate pivot-support plate, new suspension arms and new zero-degree hubs. The result?: a more stable rear end that offers more traction coming out of turns and more stability when braking.



skills left a little to be desired. Fortunately, the CR's handling helped me take the TQ spot in the first qualifier and I got consistently faster as the qualifying rounds went on.

By the time the Mains came around, I had wrapped up the TQ position by a full lap over the rest of the field. Mine was definitely the fastest vehicle on the track—even faster than the trucks that normally handle rough tracks better than buggies! My win was accomplished more easily than in past outings with my old Double-X.

After my first day of racing with the 'CR,' I sum up my impressions of it as: it steers and handles bumps much better than the original Double-X. My old Double-X used to push, and the 'CR' does not push at all! Not only that, it exits turns tighter than any Double-X I have ever driven. It handles turns with authority, and thanks to the Silver-Compound IFMAR pins tires included in the kit, rear traction is nearly perfect. These tires perform excellently right out of the box and will perform great on most track conditions.

I left the track with a trail of drool behind me and a smile on my face. That night, I replaced the stock motor with my

(Continued on page 172)



ASSOCIATED RC10 Dual Sport

by George M. Gonzalez

WHEN Associated* announces that they will release a new product, it's always big news. The entire R/C industry—distributors, hobby stores, aftermarket manufacturers and R/C enthusiasts around the world—usually waits with great anticipation. When Associated announced that they would enter the rapidly growing parking-lot racing scene

with a fresh, new concept, you can bet that they got everyone's attention.

Enter the RC10 Dual Sport (DS). The DS is based on what is probably one of the most durable and proven R/C cars on the market, the RC10. The company's goal was to introduce a car that would be easy to drive, tune and maintain, but most important, it had to be fun. The DS was designed to hook up in parking lots with little or no preparation, and this makes it perfect for club racing or just racing your friends on driveways and street corners.

SPECIFICATIONS

SCALE 1/10
LIST PRICE \$325

DIMENSIONS

Length overall 15.875 in.
Wheelbase 10.3 in.
Width (F/R) 8/8.25 in.

WEIGHT (gross, RTR) 3 lb., 7.9 oz.

CHASSIS

Type Tub
Material Aluminum

DRIVE TRAIN

Type Sealed gearbox (2.25 reduction)
Primary Pinion/spur gear
Transmission Universal-joint drive shafts
Differential(s) Ball
Slipper clutch Yes
Bearings/bushings Bearings

SUSPENSION (F/R)

Type Independent A-arm with upper link
Damping Oil-filled, coil-over shocks

WHEELS (F/R)

Type Chrome-plated
2-piece plastic
Dimensions (DxW) 1.625x1/
1.625x1.25 in.

TIRES (F/R) Pro-Line Speed Hawgs
M2 compound

ELECTRICS

Motor, battery, ESC Not included

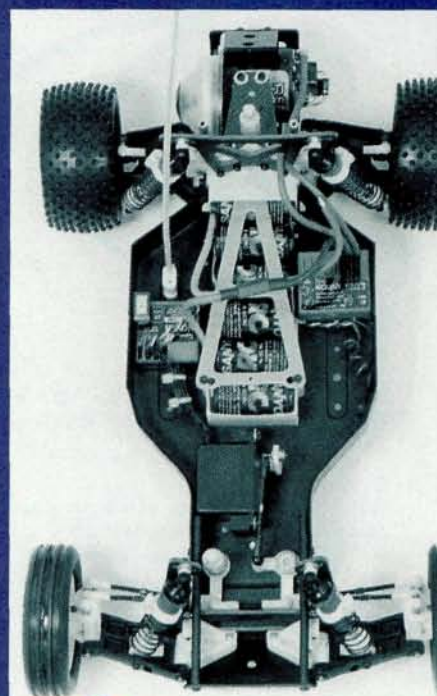
KIT FEATURES

The DS is available in a few versions. There are two Sport Kits, a Racer Kit and a Conversion Kit that allows you to convert your existing RC10 or RC10T into a DS. I was fortunate enough to receive one of the first Racer Kits to leave the factory. The information from here on pertains to the Racer Kit only. For more information on the other DS kits, check out the "Available Kits" sidebar.

You already know that the DS is based on the venerable RC10 chassis, but don't think that the DS is just a narrowed off-road buggy topped off with an on-road body. Months of research and development went into this car, and several prototypes were tested before the DS went into production.

Test Gear

- Airtronics* Caliber 3P transmitter
- Futaba* S9402 high-torque/high-speed servo
- Novak* Duster Sport II ESC
- Novak NER-3FM receiver
- Reedy* Dual Sport 12-turn motor
- Sanyo* 1700mAh sport pack
- Deans* plugs



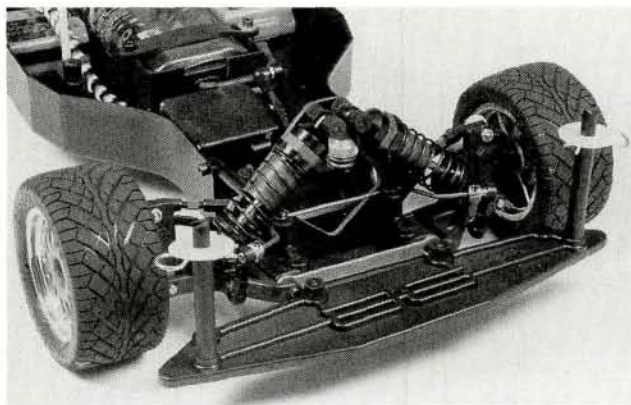
After comparing the RC10 off-road buggy above with the Dual Sport on-road racer on the right, you might think that not much has changed. Look again, 'cause there's a world of difference between these two cars!

PHOTOS BY WALTER SIDAS



The Team goes Parking-lot Racing!





The front suspension is installed on an aluminum nose plate that provides 8 degrees of kick-up. New suspension arms, a new front bumper, a new front shock tower, .56-stroke team shocks and an adjustable swaybar are all part of the Dual Sport package. Note how the tops of shocks are mounted at the chassis' centerline.

• **Chassis.** The DS uses the RC10's tough, black-anodized, aluminum-tub chassis. A new nose plate provides a total of 8 degrees of front kick-up (rake); this is a lot less than the off-road buggy's 30-degree kick-up nose plate. The low kick-up angle is better suited to on-road racing because the DS's chassis rides lower and body roll

the two bellcranks together and ensures that both wheels receive equal throw. Adjustable servo mounts are also included, and they have offset holes drilled in the bottom to accommodate a variety of servos.

The same nylon battery holder as is used on the buggy is included with the DS. The unit allows the battery pack to be mounted in-line for improved han-

RC10 DUAL SPORT

dling, and it has been dyed black to match the rest of the components. I was a little bummed that the battery holder doesn't accommodate side-by-side battery packs very well. Stick packs work fine, but it takes some effort to get a side-by-side racing pack to fit properly. Also new is a molded rear bulkhead that offers five upper camber-link mounting positions for added tunability.

The tranny is bolted onto the rear of the chassis with four screws, and a molded tranny brace secures it to the rear bulkhead. Also included is a trick, new, high-impact front bumper that doubles as a mount for the new body-mount posts. As you can see, many modifications were made to transform the chassis from off-road racer to pavement pounder, but the best part is that the RC10's world-championship-winning durability has been retained.

• **Suspension.** Up front, new, super-stiff composite, short suspension arms make the car more narrow. Separate molded shock risers are attached to the suspension arms with screws, and the shock risers were designed to provide superior on-

• **Suspension.** Up front, new, super-stiff composite, short suspension arms make the car more narrow. Separate molded shock risers are attached to the suspension arms with screws, and the shock risers were designed to provide superior on-

Building & Setup Tips



Thanks to the excellent instruction manual, the RC10DS is extremely easy to build. Photographs are provided for every step, and they're so well-done that you'll probably be tempted to build the car without reading the instructions. I highly recommend that you take the time to read from cover to cover before you attempt to build the kit, and read the text that corresponds to each step as you go along. I can't stress enough how important it is to

do the reading because you'll find useful information that the photos alone can't provide. Once you've completed the car, spend a little time reading the tuning tips in the back of the manual—very informative stuff!

I ran a dozen or more battery packs through the Dual Sport on a variety of surfaces so that I would be able to offer you some useful setup tips.

• **Making adjustments.** The DS is a highly tunable car that is sensitive to even the most minute adjustments. The best advice I can give you is to make only one adjustment at a time and check the results by driving the car a few laps. Keep in mind that adjusting your DS, or any car for that matter, involves a series of tradeoffs. If you make more than one adjustment at a

time, you'll never dial in your car because often, one adjustment will counteract the effect of another. Besides, you want to see exactly what difference each adjustment makes so that you will become a more knowledgeable R/C car mechanic.

• **Foam inserts.** The rear-tire foam inserts just don't offer enough sidewall support. When the car takes a corner hard, the sidewalls roll under the wheel, and traction becomes inconsistent. I noticed that the rear wheels were chipped and scraped after just one run. Associated has addressed this problem and will soon offer firmer foam inserts. Meanwhile, pick up some buggy rear tire foam inserts and trim them slightly to fit the Dual Sport's rear tires.

• **Assembling the shocks.** Take your time when assembling the shocks, and follow the instructions to the letter. Because the nylon spacers, washers and square split wash-

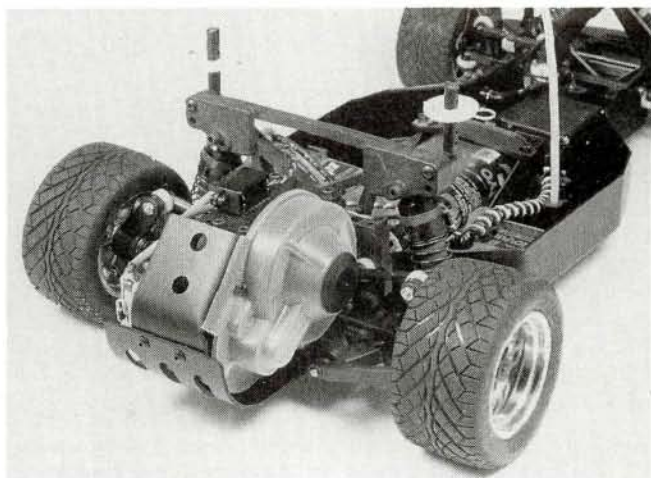
ers are molded on a parts tree, it is important that you de-burr these parts, or the shocks will never function smoothly. Remove the nylon parts from the tree with a sharp hobby knife, then sand off the burrs with fine-grit sandpaper. I recommend that you sand all four edges of the square split washers, not just the edge that was mounted on the parts tree.

When you finish building the shocks, make sure that all four shock shafts have approximately $\frac{1}{4}$ inch of rebound. Keep adding shock fluid or bleeding the shocks until they all have the same rebound. If you take the time to build the shocks correctly, you'll be able to tweak the car more accurately, and this will make a noticeable difference at the track.

• **Camber.** Start by setting the car up with 2 degrees of negative camber on all four tires. I suggest that you pick up an RPM* camber gauge (part no. 7099, \$9.95). After running two



Are these cool wheels or what? The Pro-Line Speed Haws hook up really well on just about any surface.



In the rear, you'll find Associated's legendary Stealth transmission. Universal drive shafts provide smooth power transfer to the wheels. A new, ultra-rigid, molded shock tower allows the shocks to be mounted two ways: the outer hole is used for bumpy or high-traction surfaces, and the inner hole is for smooth and slick surfaces.

road shock-mounting geometry. The suspension arms are installed on molded bulkhead blocks with hinge pins, and an aluminum hinge-pin brace is mounted between the two suspension arms for added support.

A new, extra-thick, fiberglass shock tower allows the tops of the shocks to be mounted as close to the chassis centerline as possible. This lowers the center of gravity and improves shock efficiency. A very trick swaybar system is also included, and the swaybar's tension can be adjusted

by moving the aluminum pivots forward or rearward.

In the rear, you'll find another set of short suspension arms. They're attached to molded mounts with hinge pins, and the mounts provide 1.5 degrees of toe-in on each arm for a total of 3 degrees of rear toe. Zero-degree hub carriers are attached to the suspension arms with hinge pins, and the car's overall wheelbase can be adjusted with nylon spacers. A new molded rear shock tower offers a couple of shock-mounting options for



LIKES

- RC10 race-proven durability.
- Familiar, easy-to-work-on chassis.
- Excellent suspension.
- Very effective swaybars.
- Race-proven Stealth transmission.
- Highly tunable chassis.
- Excellent handling for a 2WD.
- Pro-Line Speed Hawgs included.
- Cool-looking wheels.
- Awesome hop-up potential.
- Excellent factory support.



DISLIKES

- Servo mounts are not pre-drilled.
- Battery holder doesn't accommodate side-by-side battery packs very well.
- Foam inserts for rear tires aren't adequate.

battery packs, check the tires for wear. If you notice that they are more worn on the outside than on the inside, shorten the camber rods slightly. If they are more worn on the inside, lengthen the camber rods slightly. The goal is even wear. It is critical that you set the camber properly. If all four tires have a solid contact patch with the track, the car will handle much better. I found 1 degree of negative camber up front and 1½ degrees of negative camber in the rear to be just perfect.

• **Chassis tweak.** This is the single most important element in setting up an on-road car. Properly setting chassis tweak ensures that all four tires will drive with equal pressure on the track. If you take the time to properly set the chassis tweak, your car will be easier to drive, brake much straighter and have less tendency to wander under acceleration.

Although the assembly manual includes detailed instructions on how to set swaybar tweak, no information is provided on how

to set chassis tweak, and I feel that this is a necessary step in the dialing-in process. When I called the factory, I was told of a simple way to set chassis tweak, and I will pass it on to you.

First, set up the car according to the instructions; then charge up a battery pack and go for a ride. If you notice that the car hooks or spins out on right turns and pushes on left turns, add a thin preload spacer to the left shock. After you've done this, check the swaybar tweak as outlined in the instructions and go for another ride. If the car still hooks when it makes a right turn and pushes during left turns, add another thin washer and try again.

Your car should eventually turn equally well in either direction without hooking one way and pushing the other. If your car does the opposite, that is, it hooks when it makes left turns and pushes during right turns, add a thin preload spacer to the right shock and then adjust the swaybar tweak as shown in the manual.

• **Slipper clutch.** I found the car easier to control in the corners with the slipper set a little tight. This gives the DS more on-power steering and allows it to hold a tighter line through fast, sweeping turns. Plus, a tight slipper gives you added punch when the car exits very sharp turns under power. Keep in mind, though, that you don't want the slipper completely locked up because the diff may slip instead.

• **Swaybars.** The Dual Sport's front and rear swaybars are highly adjustable and play a major roll in the car's performance. If you need more steering, tighten the rear swaybar a tad and go for a few laps. If you still need more steering, loosen the front swaybar slightly and hit the road again.

If your car has too much steering (not enough rear traction), do the opposite. Start by loosening the rear swaybar a little. If more rear traction is needed, tighten the front swaybar a bit. To simplify things, always adjust the rear swaybar

first, regardless of whether you need more steering or more rear traction.

• **Wheelbase.** You can adjust the wheelbase according to where you install the nylon spacers on the outer rear hinge pins in relation to the rear hub carriers. If you assembled the DS as indicated in the instructions, you placed the spacer behind the rear hub carrier, and this provides the shortest possible wheelbase. With the spacer in this position, the car will have more rear traction and will understeer slightly.

By installing the nylon spacer in front of the rear hub carriers, you will lengthen the wheelbase, and this will provide more steering but rob you of some rear traction. The choice is yours, but I found that installing the nylon spacers in front of the rear hub carriers suited my driving style much better. It also improved the car's rough-track handling considerably.

RC10 DUAL SPORT

superior rough- or smooth-track handling. An adjustable swaybar system for the rear end allows rear body roll (traction) to be adjusted.

On all four corners, you'll find Associated's legendary, hard-anodized, Teflon™-coated shocks with black-anodized aluminum caps. The DS uses the smaller .56-stroke shocks all the way around, and new, shorter DS shock shafts are included. All four shocks are equipped with soft black springs and new, snap-on spring-preload spacers that are accurate and easy to use. The kit also comes with four no. 1 shock pistons and Associated 20WT pure-silicone shock fluid.

In addition, the DS has a complete set of adjustable tie rods for setting front and rear camber and front toe-in/out. Associated also included foam dust covers for all the ball joints. The covers prevent dirt and grime from entering the ball

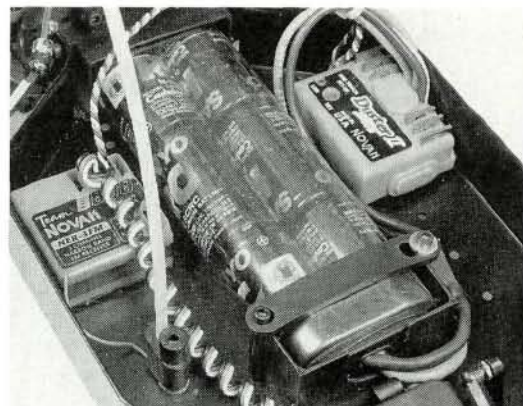
cups, and this ensures smoother and quieter performance; there's nothing worse than a squeaky suspension.

• **Driveline.** The DS uses the race-proven Stealth transmission found on the RC10. What can I tell you about this awesome tranny that hasn't been said before? The buggy's 2.25:1 final drive ratio has been retained, and it seems to be well-suited to the DS's small-diameter wheels. A set of universal drive shafts is also included, and they ensure supersmooth power transfer to the wheels.

• **Wheels, tires and body.** The DS's new two-piece chrome-plated wheels are real showstoppers. They have gold-color BBS-style inserts that greatly enhance their scale appearance. The DS comes decked out with a complete set of Pro-Line* Speed Hawg tires with foam inserts. These tires are molded of Pro-Line's super-soft M2 compound, so chances are they'll hook up on just about any surface.

Associated sent me one of their Mustang Trans Am bodies for this review. The body isn't modeled after your typical street Mustang, but it is a faithful reproduction of the Mustang Cobras that race in the SCCA or IMSA circuit. The body looks really cool mounted on the car, and it can be mounted low for that mean, slammed look. The rear deck slants upward, and with its rear spoiler, the body provides plenty of downforce, which is an important feature for a rear-wheel-drive car.

Associated provide some of the sponsor decals of the '95 SCCA Trans Am Championship-winning, Roush Racing All Sport Mustang, but for some reason, the All Sport Body Quencher logos have not been included. With a little ingenuity, though, you can make your own sponsor logos and copy the car that's shown on



The new Novak Duster II is a strong performer. Look, Mom—no heat sinks! I ran three battery packs consecutively and a Reedy DS 12-turn motor, and the ESC barely got warm. Novak's Polar Drive Technology and Hyperfet II transistors really work!

the box. I wanted to replicate the current SCCA Trans Am point series leading car, and when I wrote this article, the Raybestos Ford Mustang driven by Dorsey Schroeder was the car to beat.

I called Scot Bich of Bich'n Bodies* and asked him to perform his usual magic. He painted the Mustang body to look like the full-scale racecar. As you can see, it's as close to being an exact replica as you can get. Two Autographics* Raybestos sponsor decal sheets (part no. 652) were required.

PERFORMANCE

My first test session took place on a freshly paved asphalt surface across the street from our office. I set up makeshift corner markers and made my own track, which had hairpin corners, sweepers and long straightaways. I needed only one battery pack to get the car dialed to the point at which I was comfortable with its performance. In fact, the only adjustments I made were to the front and rear swaybars. I did, however, set up the suspension correctly, and I took the time to tweak the chassis beforehand (see the "Building and Setup Tips" sidebar).

The car was very quick and extremely smooth, but it didn't have a great deal of high-speed steering. To get into and out

THINGS YOU'LL NEED

RC10DS Sport Kit (part nos. 8080 and 8081)

- 2-channel transmitter with two servos (one for steering and one for the speed control).
- 6-cell battery pack.
- Battery charger.
- Paint for the body.

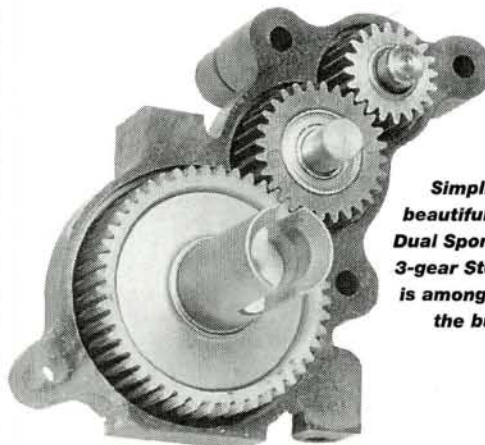
RC10DS Racer Kit (part no. 8085)

- 2-channel transmitter with one servo.
- Electronic speed control.
- Motor.
- 6-cell battery pack.
- Battery charger.
- Body and paint.

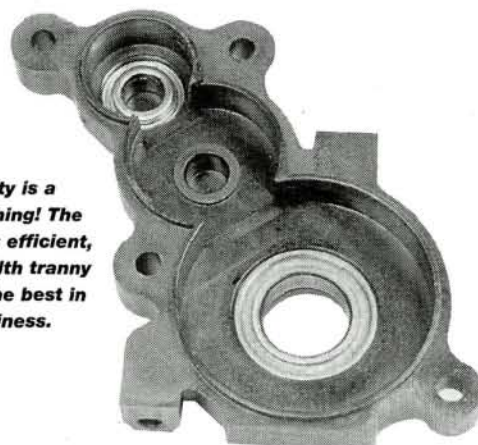
Factory Options

- Mercedes DTM body—part no. 6137.

- Mercedes DTM decal sheet—8804.
- 25-degree front caster blocks—6215.
- Graphite tranny brace—6593.
- 3-degree rear hub carrier—7358.
- Green springs—6494.
- Silver springs—8231.
- DS Unobtainium .35-stroke shock shafts—8845.
- Teflon™ shock piston kit; includes nos. 1, 2, 3 and 4 pistons (four of each)—6465.
- DS black hubcaps—8878.



Simplicity is a beautiful thing! The Dual Sport's efficient, 3-gear Stealth tranny is among the best in the business.

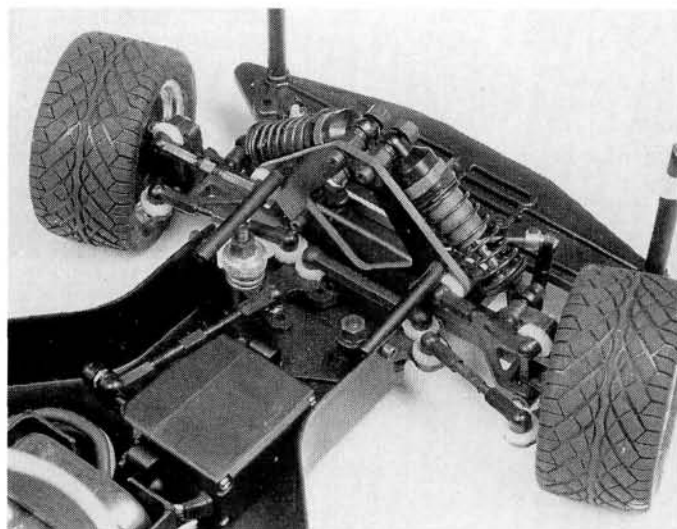


RC10 DUAL SPORT

of the corners quickly, I had to rely on the brakes more than I was used to. It took a few attempts before I was able to corner without overshooting or completely spinning out through the apex. I tried tightening the slipper, and this helped dramatically. I was then able to approach corners a little faster, tap the brake before entering, then accelerate through. I needed a bit of practice, but I was soon driving a tight line and making good time.

The next test session took place on a rough and dusty parking lot behind our building. There, the DS showed its true colors. I had to raise the body a little because the suspension was now working double-time. The car drove well on surfaces that I wouldn't dare drive my expensive 4WD sedan on. It went over the bumps without getting way out of shape, and it even drove through the sandy areas without looping out completely. I also noticed that it

A mighty Futaba 9402 high-torque/high-speed servo is protected by the adjustable servo-saver. The front end is secured by aluminum tubes that are mounted between the chassis and the shock tower. Check out the adjustable turnbuckles with foam dust covers.



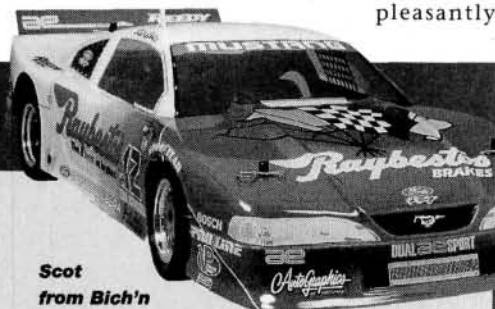
was almost impossible to roll it over except when it ran over a wooden stake that was too far away for me to see. The car caught some air, then rolled over a couple of hundred times and ended up in the woods. I was pleasantly

surprised to find that it had sustained no severe damage, but my beautiful custom-painted body was scratched, and the wing had been completely torn off. Oh well, so much for my show body. Overall, I was very impressed with the DS's performance and found it incredibly enjoyable to drive.

Available Kits:

Four kit versions of the DS are currently available:

- The Sport Kit with Mustang Trans Am bushing kit—part no. 8080, \$285
- The Sport Kit with Mercedes Class C DTM bushing kit—8081, \$285
- The Racer Kit—8085, \$325
- The Conversion Kit—8089, \$135



Scot from Bich'n Bodies did a fantastic job painting the Dual Sport's Mustang Cobra body. The Autographics Raybestos sponsor decals really did the trick for recreating the full-scale SCCA racer.

Racer Kit

Includes a full set of high-quality ball bearings; Associated's hard-anodized, Teflon™-coated Team shocks; universal drive shafts; and the rear-hub-carrier bearing spacers found on the company's RC10B2 and RC10T2 off-road vehicles. The Racer Kit does not include a body or electronics, though. If you already have a motor and an electronic speed control, this is the kit to buy. R/C'ers who plan to do some serious parking lot pounding need look no further. Keep in mind, though, that if you plan to buy a Sport Kit and upgrade it to a Racer Kit later, you might want to save a few more coins instead and buy the Racer Kit right from the get-go. You'll save a ton of cash this way!

Sport Kits

Both Sport Kits are equipped with bronze bushings instead of bearings, gold-anodized shocks with molded shock caps instead of the hard-anodized Team shocks and dogbones instead of universal swing shafts. The Sport Kits do, however, include a competition stock motor, a resistor-type speed control with battery-eliminating circuitry and a body. If money is a consideration, this is the perfect choice. The Sport Kit will get you started quickly and economically.

RC10DS Conversion Kit

Those of you who have an old RC10 buggy or RC10T truck lying around collecting dust will be glad to know that you can now convert either one into a DS for far less cash than it costs to buy a complete kit. With Associated's DS Conversion Kit, you can give your old buggy or truck a new lease on life by transforming it into a highly competitive street racer. The Conversion Kit will not work with Associated's newer RC10B2 and RC10T2 off-road vehicles.

FINAL THOUGHTS

OK, I know the question that's on your mind: does the DS handle better than a 4WD sedan? The DS requires more driver involvement, and it's not as forgiving as your typical 4WD sedan.

As with most 2WD vehicles, you have to deal with understeer or oversteer. When you set up the DS, you'll have to compromise between one and the other. Although 4WD sedans also understeer and oversteer, it's usually less of an issue with them, and in most cases, you can set them up to drive neutrally; this allows them to drift in the corners rather than get completely out of shape. Four-wheel-drive sedans can also brake in a straight line and come to a complete stop much more quickly. This lets them enter and exit corners faster without the risk of overshooting the turn.

On the other hand, the DS handles very well on rough and dusty surfaces, such as street corners and vacant parking lots, which are places where R/C'ers typically drive their cars. The DS is also easier to work on, more durable and more challenging to drive than most 4WD sedans. The DS Racer Kit that comes with bearings costs less than most 4WD sedans that offer bearings only as an option. So if you want an easy-to-build and maintain on-road car that looks good, drives well and is economical, look no further; the Dual Sport has arrived.

*Addresses are listed alphabetically in the Index of Manufacturers on page 173.

CAR ACTION THRASH TEST

1/10 SCALE ELECTRIC



patriotic ★ pony

The Tamiya Mustang R is based on the popular TA02 chassis, which features a shaft-driven full-time 4WD drive train, 4-wheel independent suspension with plastic, oil-filled shocks, front gear and rear ball diff and sticky-rubber slick tires.

SPECIFICATIONS

SCALE 1/10
LIST PRICE \$285

DIMENSIONS
Length overall 18 in.
Width 7 in.
Wheelbase 10.1 in.

WEIGHT (gross, w/batteries) 3 lb., 4 oz.

CHASSIS
Type Molded tub
Material Plastic

DRIVE TRAIN
Type Sealed gear drive
Primary Pinion/spur
Differentials (F/R) Gear/ball
Bearings/bushings Plastic and metal
bushings

SUSPENSION (F/R)
Type 4-wheel, independent
w/fixed upper links
Damping Oil-filled, coil-over plastic
shocks

WHEELS (F/R)
Type One-piece plastic
Dimensions (DxW) 2x1 in.

TIRES (F/R) Semi-pneumatic slicks

POWERPLANT
Motor Stock 540
Battery Not included
Speed control 3-step mechanical

TAMIYA Mustang Cobra R

by Dan Haas



INTRODUCING THE KING of all Cobras—the Ford SVT Mustang Cobra R. This is one of Tamiya's* latest offerings in the growing world of narrow-chassis 4WD on-road racing. It's the first American IMSA (International Motor Sports Association) racecar Tamiya has added to its growing family of TA02-based European and Japanese touring sedans. Tamiya is known for its awesome bodies, and this Cobra is a prime example. Is it the new "boss" in town? Read on to find out.

KIT FEATURES

As is the case with all Tamiya kits, the instructions are clear and concise with full-scale drawings of all the parts. Each step of the assembly is accompanied by a separate parts bag, making assembly very easy. Building the car is a lot of fun, too! There is no doubt that the Cobra R is the perfect car for novice R/C racers.

The Cobra R has Tamiya's race-proven TA02 chassis. This shaft-driven 4WD chassis includes full independent suspension, plastic oil-filled coil-over shocks, an adjustable rear ball diff and planetary gear front diff. A mechanical speed control and 540-type motor are also included.

The racing slicks are mounted on one-piece, five-spoke racing wheels that look outstanding combined with the Mustang body. The molded polycarbonate body is based on the 1995 limited-edition Cobra R. It is an amazingly detailed reproduction that includes separate molded side mirrors and a rear spoiler. Tamiya simplified the painting and assembly of the body with several nice features. Window masks and a clear-plastic mask that covers the outside of the body to avoid overspraying during painting are included. To make drilling holes for the mirrors, spoiler and body mounts a bit easier, small indentations are molded into the body.

The kit includes an elaborate decal sheet that allows you to replicate the full-scale Hacker Racing IMSA Mustang. The decal sheet is one of the best I've ever seen, but you can paint the car any color you like, eliminate the sponsor

THE HACKER EXPRESS COBRA R The Real Deal!

TAMIYA has always been known for re-creating highly detailed, scaled-down versions of many vehicles. Most recent is this Hacker Express Racing, IMSA-prepped Mustang Cobra R. In stock showroom condition, Ford's Cobra R is a potent street machine. It comes equipped with a 351 V8 that produces 280hp at 5,250rpm, and has 343 lb.-ft. of torque at 3,750rpm. It can accelerate from 0 to 60 in 5.2 seconds, and it rockets through the quartermile in 13.8 seconds at 102mph. It can stop dead from 60mph in 109 feet (which is far better than most of the high-dollar exotic sports cars, including the Acura NSX, Dodge Viper, Ferrari F355, Mazda RX-7, Toyota Supra, Mitsubishi 3000 GT VR-4, Nissan 300ZX Twin Turbo, Corvette ZR-1 and even Porsche 911 Carrera!). From the factory, it's already an impressive ride. After undergoing the IMSA transformation (full engine, suspension and chassis and body mods) the Hacker Racing team was set to start the '95 season with an all-new, untested car. They started off the season at Sebring International Raceway in Sebring, FL, with a fourth-place finish and were able to weather the "developmental" process enough to finish fifth in the year-end points standings. The Hacker Express Mustang completed more miles than any car in the series.

The Hacker Express racing team consists of Paul and Karl Hacker and Bart Hayes. Here's a little more about the team.

Paul Hacker is the team owner. He has 102 career victories, 22 career championships and the most IMSA Endurance championships (1985, '88 to '89, and '91). He is the manufacturer championship leader ('85 to '89) and has more championships than any driver in IMSA history.

Karl Hacker is the chief mechanic and co-driver, and he has 12 professional championships under his belt. Karl has five manufacturer titles, and he is tied with Paul for the most IMSA starts. Karl is also second in EC (Endurance championship) wins.

Bart Hayes is new to the team. He recently completed his first full IMSA season. Bart has three championship titles and is the spokesperson for Duragloss Car Care Products.

If you're an IMSA fan, keep your eyes peeled for the Hacker Express Racing team this year. With help from their new sponsors, Duragloss Car Care Products and Toyo tires, they hope to take their new Cobra R into the winners' circle often.

by John Howell

graphics and make it look like a mean street machine. This car will appeal to Mustang owners around the country. I heard many "oohs" and "ahhs" during the performance test.

TEST GEAR

Here's what I used to tame my new pony:

- Futaba* Magnum Sport radio system.
- Airtronics* 94102 servo.

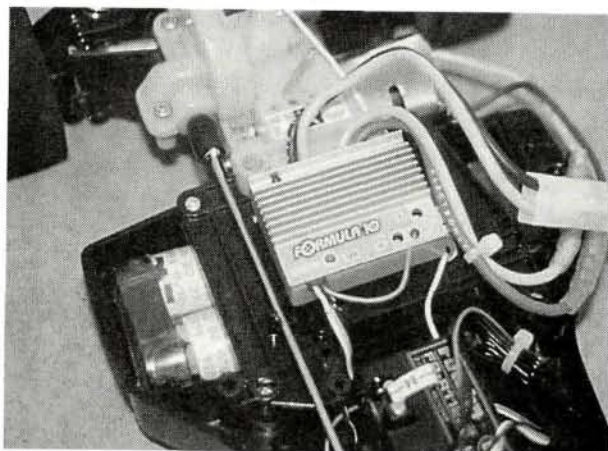
Building & Setup Tips

- Use plenty of grease on all the plastic and metal bushings. A smooth drive-line is extremely important for performance and efficiency.
- Use plenty of grease on the internal metal gears of the front gear diff. The more you put on, the better the diff will perform.
- On the rear ball diff, apply diff lube sparingly. A small dab on each diff ball is all you'll need.
- When you assemble the rear differential, be sure to install the concave washers. Follow the diagram closely for proper installation.
- When you build the dampers, hold the piston rod with pliers. Be sure to first wrap the piston rod with a piece of cloth so you don't scratch the rod and cause damper leakage.
- I used a helpful tip from associate editor George Gonzalez to apply the decals. George told me to cut out the decals as close to the trim lines as possible then remove the backing material and dip the decals one at a time into soapy water. This allows you to slide the decal to just the right place. When it's positioned correctly, dry it with a hair dryer for a few seconds, and bingo! Use this process with decals that conform to the contours of the car's body, such as the red stripes on the side of the Mustang. I also cut out some of the stars individually and applied them separately; this took more time, but the result was worth the effort.

- Tekin* Formula 10 electronic speed control.
- Trinity* Monster Stock Jr. 3 motor (after using the stock 540 motor).
- Sanyo* 1400 SCR sport pack.

PERFORMANCE

After I had applied the last decal, I was ready for a test run. I headed out to a nearby mall parking lot to put the ponies to the test. The stock 540 motor provided decent acceleration and long run times. The steering was excellent, and the car was never out of control. The slicks really kept the car hooked, even on rough areas of the pavement. After a couple of



The Mustang has been decked out with Futaba radio gear, a Tekin Formula 10 ESC and a 1400mAh stick pack. For easy installation, the ESC comes equipped with bullet motor connectors and a standard Tamiya-style battery plug.

THINGS YOU'LL NEED

- Radio and receiver.
- Battery pack.
- Battery charger.
- Two servos (one for speed control, one for steering).
- Paint.



Factory Options

- Full ball-bearing set—part no. 53167.
- Stainless-steel suspension-shaft set—53098.
- On-road tuned-spring set—53163.
- Speed-tuned gear set—53127.
- M2 radial tires—53227.



LIKES

- Beautifully detailed body.
- Window masks and outer-body mask.
- Sharp-looking racing wheels.
- High performance right out of the box.



DISLIKES

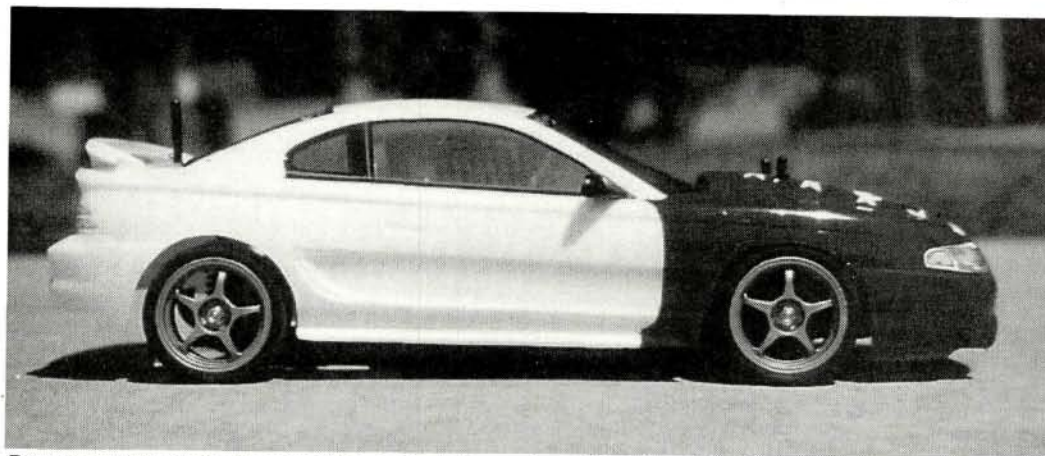
- Nothing!

runs, I switched to the Monster Stock Jr. 3 motor. The extra power caused the tires to spin on takeoff, yet the car kept to a straight line. At full speed, the car never spun out while turning. Body roll was evident, yet all four tires stayed pinned to the ground. Overall, the handling was excellent, and the body sure looked good!

FINAL THOUGHTS

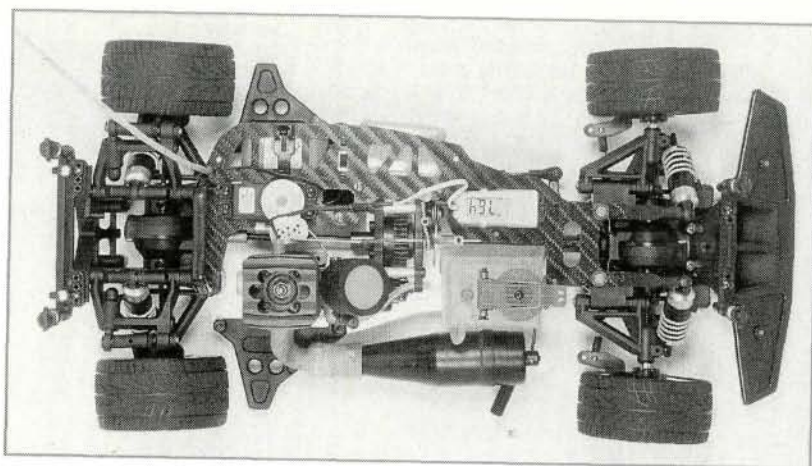
With a fantastic racing body and a high-performance chassis, Tamiya has a definite winner here. I plan to add Tamiya's sport tuned gears and a set of radial tires for some awesome racing action, but in stock condition, the Cobra really performs!

*Addresses are listed alphabetically in the Index of Manufacturers on page 173.



Because of the outstanding graphics, a simple two-color paint scheme is all that's required.

by Frank Masi

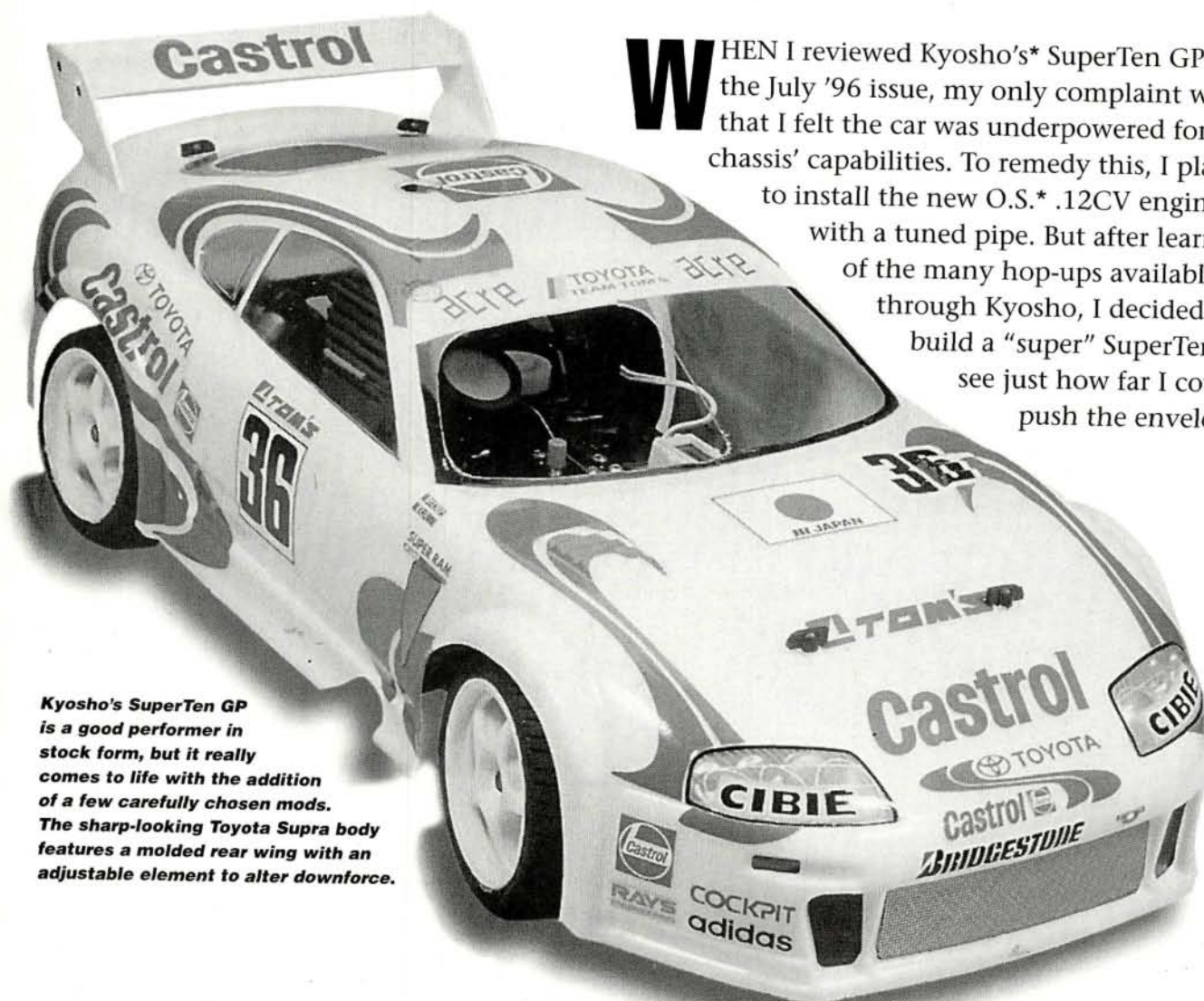


The SuperTen's 4W independent suspension remains unchanged save for the addition of Kyosho's optional "toe-adjuster" rear arms. Note the Kose carbon-fiber upper chassis plate, MIP On-Board Temp gauge and Kyosho tuned pipe.

Tuning and modifying the
KYOSHO

SuperTen GP

WHEN I reviewed Kyosho's* SuperTen GP in the July '96 issue, my only complaint was that I felt the car was underpowered for its chassis' capabilities. To remedy this, I planned to install the new O.S.* .12CV engine with a tuned pipe. But after learning of the many hop-ups available through Kyosho, I decided to build a "super" SuperTen to see just how far I could push the envelope.



Kyosho's SuperTen GP is a good performer in stock form, but it really comes to life with the addition of a few carefully chosen mods. The sharp-looking Toyota Supra body features a molded rear wing with an adjustable element to alter downforce.

• **Powerplant.** The new O.S. Max .12CV engine represents the state of the art in model car racing engines. Its heat-vent cylinder head is supposed to direct airflow down toward the combustion chamber for better cooling in closed conditions, such as under a full-body touring car. To provide the best airflow, the head can be repositioned according to how the engine is mounted on the chassis (either fore and aft or from side to side). Also, O.S. has added special webbing to the engine's crankcase to prevent warping and flexing.

The CV also features O.S.'s type 10E carburetor, which has O-ring-sealed needle valves to prevent air leakage. The valves were designed to hold their settings against shock and vibration. I found the settings ultra-precise, and they did, in fact, remain where I put them even during lengthy test runs.

To complement the new engine, I installed Kyosho's tuned pipe and manifold set. Many hobbyists fail to realize the importance of their engine's exhaust system to overall performance. A restrictive pipe will stifle even the hottest racing engine.

• **Chassis.** I didn't like the SuperTen's stock chassis plate simply because its screw heads weren't countersunk and would therefore scrape the ground. I installed Kyosho's beautiful hard chassis plate, which is not only thicker than the stock plate, but also has countersunk screws for a smooth undercarriage.

I used a Kose* carbon upper plate, which is slightly lighter and more rigid than the

PARTS LIST

KOSE

- Super Steering set (VIII)—part no. K7104
- Carbon upper deck set—K7100

KYOSHO

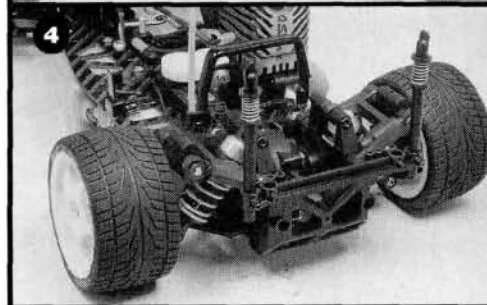
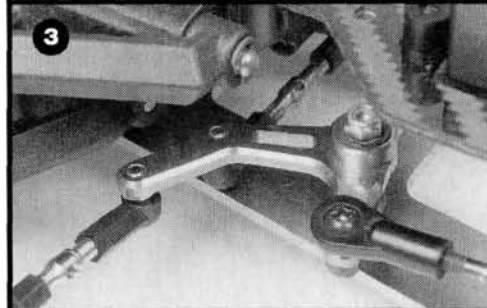
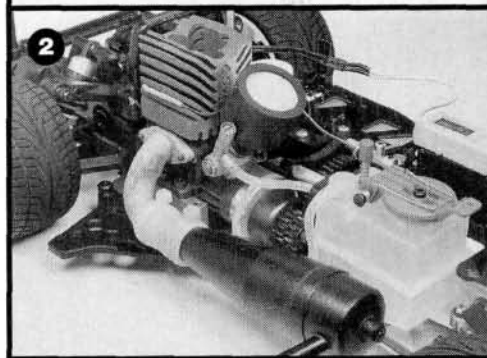
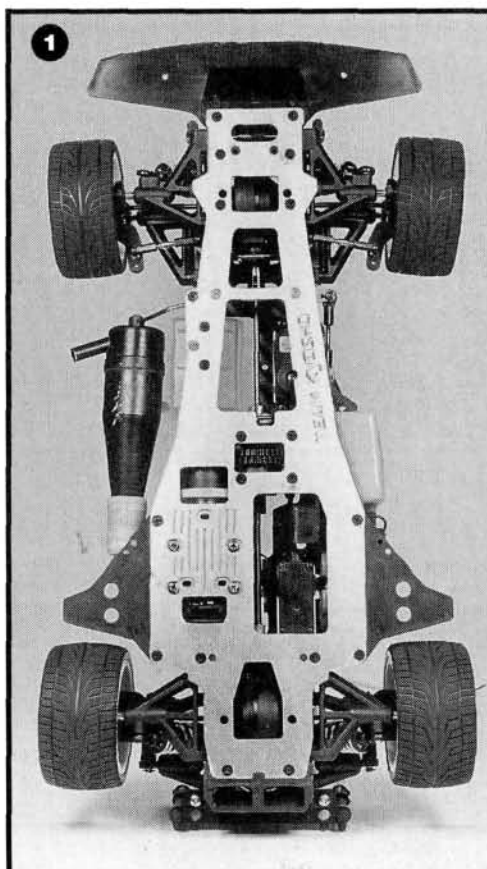
- (2) titanium suspension shafts (A)—FZW10
- Titanium suspension shafts (B)—FZW11
- (2) titanium suspension shafts (C)—FZW12
- (2) ball-diff sets—39507
- Hard high-geared ring gear—39508
- Toe angle adjuster suspension—FZW8
- Hard main chassis—FZW4
- Tuned exhaust set—39517
- Two-speed transmission—39305
- On-road shock-spring set

MIP

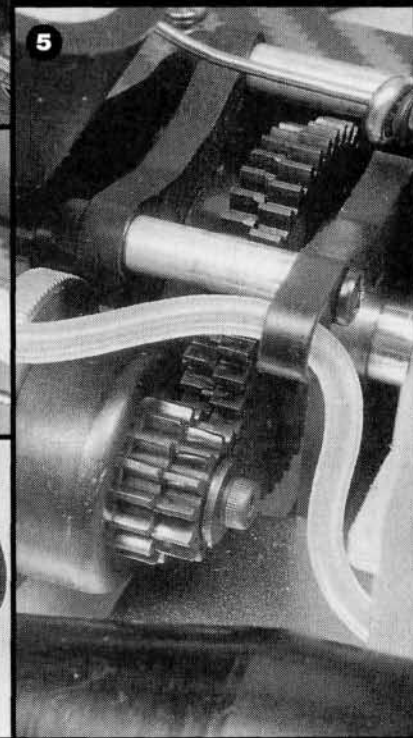
- CVO driveshafts

O.S. MAX

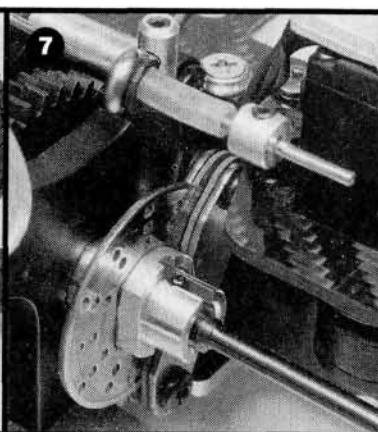
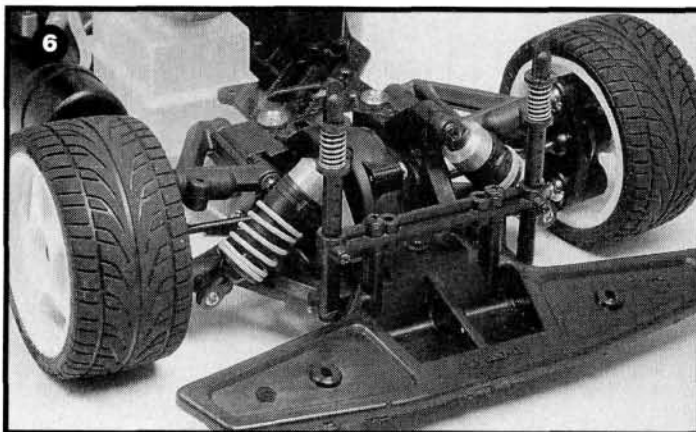
- .12CV engine



1. Kyosho's beautiful "hard chassis" is thicker than the stock, aluminum chassis plate, and it features countersunk screws that provide a smooth underside—no snagging or dragging on the ground. It killed me when I saw the scratches (caused by rocks!). 2. The best mod I made to the SuperTen was the addition of an O.S. Max .12 CV engine. It's much more powerful than even the stock kit's .15! When it's mated to Kyosho's 2-speed tranny, speeds of 50mph to 60mph are possible. The wire around the engine's cylinder head is MIP's new "The Loop" probe end for its temp gauge. 3. Kose's steering kit for the SuperTen features trick-looking, blue-anodized aluminum bell-cranks plus adjustable turnbuckles, aluminum posts and molded rod ends. 4. The rear suspension benefits from the addition of Kyosho's optional upper-arms, which allow rear toe-in to be set. I saw no need to replace the kit's plastic, oil-filled shocks, as they seemed to work fine. 5. Kyosho's 2-speed transmission for the SuperTen provides the best of both worlds: blistering acceleration and top speed. The point at which the shift from first to second gear occurs can be adjusted by setting the tension of the spring inside the 2-speed's clutch unit.



SUPERTEN GP



6. The kit's plastic shocks work well with Kyosho's optional Tuned Spring Set. Adjustable body mounts fit any of the available SuperTen bodies, and they don't require clips to hold the body.
7. The kit's stainless-steel brake disk held up well during many runs, even with the horsepower boost.

stock, aluminum piece. The Kose plate's fit and finish were excellent. I also installed Kose's Super Steering kit, which replaces the kit's molded bellcranks with sharp-looking, blue-anodized aluminum ones. The bellcranks are supported by metal bushings; however, I'd replace them with ball bearings because the bushings have a degree of slop to them.

• **Driveline enhancements.** For the best of both worlds (acceleration and top speed), the only way to go is to use a 2-speed transmission. Kyosho's unit comprises a new clutch bell that has pinion gears in two sizes and a set of spur gears in two sizes that replace the stock kit's center gear and shaft. Up to a certain rpm, the larger of the two spur gears is driven to provide stump-pulling acceleration. At a predetermined rpm, which the user can set, a clutch-type mechanism causes the second, smaller spur gear to engage. This overrides the larger gear to provide stellar top-speed gearing.

While I had the SuperTen disassembled, I installed Kyosho's optional ball differentials in both the front and rear gearboxes. The ball diffs increase stability during full-throttle acceleration, and they slip just a little to lessen shock to the drive system and wheels. Up front, I added Kyosho's special, hardened-steel overdrive gears (these have a ratio of 3.08:1 versus the stock gear's ratio of 3.36:1). This ring-and-pinion gear set allows the front wheels to turn slightly faster than the rears for added traction on slippery surfaces.

I used MIP's* new Constant Velocity Driveshafts (CVDs), which are specifically made for the SuperTen. These drive shafts feature low binding for efficient power transfer. They're rebuildable, and this makes them economical in the long run. I've used CVDs with great success on everything from electric stadium trucks to touring cars to 1/8-scale gas buggies, so I was glad to see them for the SuperTen.

• **Suspension.** Even with the increased power and speed of the CV engine, the SuperTen's platform is up to the task with-

out much tweaking. Other mods include Kyosho's optional rear suspension arms (which allow the car's rear toe-in to be set), Tuned Spring Set (green springs up front and yellow at the rear) and lightweight titanium suspension shafts.

• **Electronics.** I used two JR-Remote Control* 2135 servos (one for throttle, one for steering). My Airtronics* Caliber 3Ps controls the SuperTen through its 93327 27MHz receiver. The on-board radio system is powered by a 5-cell Dynamite* 600mAh battery pack. To monitor engine temperature, I installed an MIP on-board gauge with the company's new loop probe end, which was specifically designed to be connected to oddly shaped cylinder heads, such as that of the O.S. CV engine.

PERFORMANCE

Because the O.S. .12CV isn't a pull-start engine, I enlisted the help of my DuraTrax* starter box. I removed the small posts that align the flywheel of my Inferno MP-5 with the starter's rubber wheel, then I just eyeballed the alignment of the CV engine's flywheel with the starter wheel and gave it a bump.

The O.S. engine fired immediately and idled confidently, slurping down vast amounts of Blue Thunder* 20-percent-nitro fuel. (Remember, a new engine must be broken in thoroughly, and the best way to do this is to run a few tankfuls of fuel through it at a very rich setting.) As set by the factory, the carb's needle settings were very close to perfect, so they didn't require much fiddling.

Being new to 2-speed transmission technology, I wasn't sure what to expect or what the shift would sound or feel like. Fortunately, there's nothing subtle about the process! Even with the engine set rich, the SuperTen launched from a dead stop (thanks to the 2-speed's low-ratio first gear), then literally chirped its tires as it shifted to the taller, second gear. The point at which the transmission shifts from first to second can be adjusted by turning a small, 1.5mm setscrew. I felt that the shift was occurring

too quickly and that the engine wasn't winding out enough in first gear, so I played with this setting until the car topped out in first gear before shifting into second.

The addition of the ball diffs and the front overdrive gear set markedly improved the car's stability during acceleration. I used the same tires that, during the stock kit's initial testing, I deemed merely adequate, and handling was vastly improved. The Kyosho ball diffs are extremely smooth and operate so freely that you might think they've been set too loosely.

In narrow form, the new and improved SuperTen can be a handful at high speeds because if you lift the throttle, the rear end has a nasty habit of breaking loose (there's a wide suspension conversion kit available, but current SuperTen bodies are too narrow to accommodate it). The key to adhesion is to stay on the gas—at least partially—during fast turns. With the wide suspension kit, the car is substantially more stable, but, of course, you'll have to find a wider body unless you like the tires to protrude from beneath the bodywork.

Overall, I'm completely thrilled with the performance of my modified SuperTen. Most of the credit, however, must go to the O.S. CV engine, which transforms this already excellent chassis into a rocket-sled that any racer will take seriously. This is one of the few R/C cars that I've wanted to drive until its tires fell off. I must have run 20 tanks of fuel through the SuperTen during one session, and the O.S. engine never sputtered or quit. In fact, the engine idled contentedly for minutes at a time, then roared to life without hesitation when I stabbed the throttle.

If you own a SuperTen, I highly recommend that you at least upgrade to a competition-level .12 or .15 engine and add a tuned pipe; it's the best mod you can make to this potent chassis. If your budget allows, add the 2-speed and hold on!

*Addresses are listed alphabetically in the Index of Manufacturers on page 173.



tire guide

by Aaron Biner

Trying the treads, rating

THERE are many tires to choose from for your Tamiya*, Kyosho*, HPI*, Yokomo*, Schumacher* and Tenth Technology* sedan. There are wide, narrow and super-narrow tires, many different

types of treads and slicks in several different compounds. You can use treads on the front and slicks on the back or vice versa. You can use soft tires in front and medium or hard tires in the rear. Choices, choices, choices!

Keep in mind that no tire or tire combinations work equally well on all track conditions. You must experiment to find the right tires for your car, your driving style and the track. This article is intended to help you find the tires that work best for you.

To prepare it, I ran more than 30 types of tires from six manufacturers on eight tracks. I tested tires on a wide HPI RS4, a narrow Kyosho TF-2 and a wide TF-2. Track conditions ranged from



TOZAI MODEL FACTORY

- **Type C Radials**—GT-11N, \$TBA (standard).
- **Type D Radials**—GT-12N, \$TBA (standard).
- **Type C Slicks**—GT-01N, \$TBA (standard).
- **Type D Slicks**—GT-02N, \$TBA (standard).

The C Compound Soft Slicks seem to be the best of the Tozai tires. The rubber compound actually resembles the rubber used on full-scale racecars. On some tracks, the traction was great; on others, only a little above average. They come with Tozai's Medium Foam Inserts, but I found that the Tozai Hard Foam Inserts work better. The C Compound

Soft Treaded Tires also perform exceptionally well. They have more traction than the C Compound Soft Slicks, so use them on rougher tracks when the slicks aren't biting enough.

If you find your car has too much steering, use the D Compound Slick Tires. These are made of a harder rubber that reduces steering and makes the car go more easily through the turns. Don't expect to get a lot of runs out of these tires. In my tests, I found they only lasted 5 to 8 runs before I noticed a substantial performance loss.



Tozai Type D Slick.



Tozai Type C Radial.

the rubber

smooth and slick to dusty and bumpy. I tested on a completely "Velcro" (high-bite) track as well. This variety allowed me to draw some general conclusions about tire combinations in differing track conditions.

This guide is not intended to be the "bible" of tire setup. These are just the considered opinions of one racer with a few years of racing under his belt. My intention in this article is not to make specific recommendations, but to provide you with a good starting point from which to build your own knowledge base and to serve as a basis of comparison for your own driving experience using these tires.

Treaded vs. Slicks. What's the Difference?

Which type is right for you? As always, it depends on track conditions.

• **SLICKS.** If you run on a smooth, dust-free track, you will find that slicks work better. This is because slicks have a larger contact patch than treaded tires. Also, treaded tires tend to push (understeer) as they drive through the turns. It will seem as though the treads fold over to get traction. On this kind of track, this type of traction isn't very consistent in the turns. Full-scale touring, stock, F1 and drag cars all use slick tires because the tracks they race on are smooth and dust-free. No other tires stick to the ground quite like slicks. Silky-smooth slicks just don't cut it on rough and dusty tracks. They slip and slide through the turns and spin out under power.

• **TREADS.** When running on rough or dusty surfaces, treaded tires will prevail every time. They are effective because the tread can bite through the bumps, cracks and dust of a rough track better than the slicks.

Many racers run treaded tires up front and slicks in the rear, or vice versa. Most of the time, racers combine treaded tires with slick tires to balance front and rear traction, but there is a better way. It's better to use the same kind of tire, e.g., slicks or treads all the way around, and to vary the traction by using different tire compounds (soft, medium, or hard) on the ends of your car. For instance, you can install soft slicks up front and medium or hard ones in the rear. You could also run a softer-compound tread up front and a harder-compound tread in the rear. How about running the same compound but different tread patterns on either end?

As you can see, the combinations are endless. Proper car setup is very subjective. Who's to say that your setup is wrong?—especially if your car is dialed and you win races.

PRO-LINE

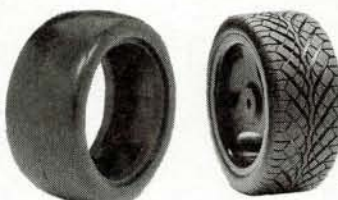
- **Sedan Hawks**—1066, \$12.50 (standard).
- **Sedan Speed Hawks**—1086, \$12.50 (standard); 1087, \$12.50 (wide).
- **Sedan Slicks**—1067, \$12.50 (standard); 1088, \$12.50 (wide).

Pro-Line's original Sedan Hawks are probably the most scale-looking tires around, and they look cool mounted on sedans that are equipped with highly detailed body sets. On high-bite and chemically treated tracks, these tires produce a ton of traction, which can cause rollovers, so a little experimentation with suspension setups is required if you plan to use these tires in competition. On dusty, unprepared street corners, however, they really excel.

Of all the tires made by Pro-Line, the Sedan Speed Hawks worked best and provided the most bite. The Sedan Speed Hawks are perfect for asphalt tracks with extremely high bite and track surfaces that have not been treated with traction conditioners such as sugar water. Sedan Speed Hawks are also available in a wide version and in Pro-Line's softer M2 compound.



Pro-Line Sedan Hawk.



Pro-Line Sedan Slick (left) and Sedan Speed Hawk (right).

Pro-Line recently introduced their new Sedan Slicks, and I did not have the opportunity to test them because they were still in the molding stages, but they look very promising. The Sedan Slicks are available molded from XTR or the sticky M2 compound and will feature a low-profile design with rounded edges for an improved contact patch. They will include foam inserts (Pro-Line provides foam inserts for all of their sedan tires) and are available in a wide configuration (1088, \$12.50).

touring car tire guide

HPI

- **V-groove**—4540, \$13 (standard); 4545, \$14.50 (wide).
- **Low Profile Super Radials**—4520, \$13 (standard).
- **Super Radials**—5130, \$13 (standard); 4511, \$14.50 (wide).
- **Super Slicks**—4515, \$13 (standard); 4516, \$14.50 (wide).

HPI tires have been among the most popular tires for touring cars since the introduction of the Super Radials and Super Slicks. With the addition of the newer Low Profile Super Radials and V-groove Radials, HPI offers tires to meet the needs of every racer. HPI offers all their tires in both wide and standard widths.

The original Super Radials work well on most track conditions and last an amazing 20 to 30 runs! After about a half a dozen runs, they're broken in and provide more steering and traction than when new. In fact, they begin to hook up at the point at which most other tires start to show signs of wear! This is a wonderful all-around tire for racers on tight budgets.

The Low Profile Super Radials are molded from the same rubber compound as the original Super Radials and feature the same tread pattern. The only difference between the two is that the treads on the Low Profile Super Radials are not as deep, which gives them a lower profile. The Low Profile Super Radials don't need to be broken in and will provide more traction from the get go. The only drawback is that they wear out twice as fast as the original Super Radials. As a rule, use the Super Radials on bumpy tracks and the Low Profile Super Radials on smooth tracks.

The HPI Super Slicks provide tons of traction on high-bite tracks, but in some cases, they can provide too much traction and can cause traction rolls in the corners. Tamiya's Molded Hard Shaped Insert (23209, \$9.50) works incredibly well with these tires and will lessen traction rolling. These tires don't handle bumps as well as treaded tires, however, and can make handling inconsistent on dusty or sandy tracks.

The HPI V-groove Super Radials are among the best tires available, and they fall in the "must-have" category. They provide more traction on high-bite tracks than HPI's Low Profile Super Radial tires because they have more surface area touching the ground. They also offer

quicker steering and increased stability because of the contour of the sidewall and aggressive V-tread with center rib design.



HPI Super V-groove Radial (wide).



HPI Super Radial (wide).



HPI Super Radial (narrow).



HPI Super Slick (wide).



HPI Super Slick (narrow).

How to **Avoid** Getting **Flat Spots**

Have you ever noticed flat spots developing on your sedan tires? This happens when the ends of the foam strip that's inside the tire separate and "bundle up" on one side of the tire. You can prevent this by using 3M Spray Mount Artist Adhesive on the ends of the foam strip. Spray a liberal amount of adhesive onto a clean surface such as wax paper, and dip the ends of the foam strip into it. Wait about five minutes for the adhesive to become tacky, and then install the foam strip inside the tire. The two ends of the foam strip will not separate, and your tires will never develop flats spots.

TRIMMING THE FAT

Have you ever noticed that your tire looks "bloated" after you've installed the foam insert and glued the tire to the wheel? Well, you're not alone. This has happened to many of us. I've noticed it happening more with the foam inserts that are included with narrow HPI and Pro-Line tires. This is not good because a bloated tire will suffer a loss of both steering and traction. Trim about 1/8 inch off one of the edges of the foam insert before installing it inside the tire, and then mount the tire on the wheel. Take the time to do this first, because there is no turning back once you've glued the tire to the wheel.



3M Spray Mount Artist Adhesive works great for gluing the ends of foam strips together.

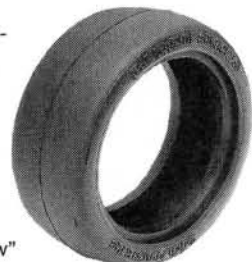
KYOSHO

- **High Grip Slicks**—92442, \$17.99 (standard); 92551, \$20.99 (wide).

During tests, I found that the standard-width High Grip Slicks worked best. But these tires have too much grip and could make your car "roll" slightly going through the corners. For less rear traction, try the wide High Traction Slicks. That's right; I

said *wide* tires! (Check out the "Wide versus Narrow" sidebar for a complete explanation.)

One nice thing about the wide high-traction slicks is that they come with foam inserts. A few words of caution though: when you mount them, you must use Kyosho's wide wheels. Other wheels will be too narrow.



Kyosho High Grip Slick (narrow).



Kyosho High Grip Slick (wide).

Did You Say "Super-Narrow"?

Lately, a few Japanese sedan tire makers have started to produce the new "super-narrow" tires. The first ones to find their way into the U.S. are the Yokomo Hyper Grip Radials (part no. ZR-082) and Hyper Grip Slicks (ZR-058). The narrower tire results in a quicker reaction in the turns, and they are considerably lighter than standard tires, so they reduce unsprung weight and rotating mass.

These tires take some getting used to, and at first, they may seem a bit "twitchy," but with practice, you will notice that they can be a great advantage on small, tight tracks. HPI announced that they will soon add super-narrow tires to their extensive line of sedan tires as well as several types of super-narrow wheels with different offsets. These will allow racers to adjust the front width on the company's RS4 touring sedan. I'm sure other tire manufacturers will jump on the bandwagon and start making super-narrow tires.

Team Yokomo driver Masami Hirotsuka was one of the first to have great success with the super-narrow tires. At the '96 NORRCA On-Road Nationals in Las Vegas, NV, he swept his competition under the rug with his new Yokomo YR-4M sedan equipped with super-narrow Hyper Grip Radial fronts. At the World's Warmup race at Revelation Raceway in Southern California, Masami repeated his performance by taking TQ, winning all three A-Mains and the overall championship. At that race, Masami's YR-4M was decked out with super-narrow Hyper Grip Slick tires on all four corners!

MAKING YOUR OWN SUPER-NARROW TIRES

Can't get your hands on a set of these hot, new super-narrow Yokomo tires? Don't feel like waiting for HPI or some other company to manufacture them for you? Why not make your own? It's easy. Trim a set of your favorite sedan tires. Many 4WD off-road racers have been narrowing tires for many years because suitable tires weren't available commercially.

Before you start, keep in mind that it's easier to narrow radial tires because almost all have a center rib or ribs that you can use as a trim line. It is important that you cut very straight, or it will be difficult to reglue the two halves. For this reason, stick to radial tires. It takes an enormous amount of talent to make straight cuts on slick tires. The HPI V-groove Super Radial, Yokomo ZR-080,

Wide versus Narrow. What's the deal?

By now, you have probably noticed that many sedan tire manufacturers produce tires in wide as well as narrow widths, perhaps to win the business of racers who feel they are not getting enough traction with narrows. Although, at first glance, it seems the wide tires would have more traction because of their larger surface area, this is not always the case. Most wide tires actually have less traction than narrow tires!

The reason behind this is that narrower tires flex differently from wide tires, and it's most noticeable in the corners. Narrow tires provide more side bite because the sidewalls don't flex as much. You will get more forward bite with wide tires, but if you can transition through the turns more quickly with the narrows, why use wider tires? When you set up your car, use wide tires *only* when forward traction is more important than traction in the turns.

ANOTHER OPINION

We talked to Kent Clausen from HPI about the advantages of running wide tires on the rear end of your sedan. According to Kent, many of the wide tires that are available today do indeed provide more traction than standard-width tires, but some of the softer-compound wide tires actually provide less traction because they flex in the corners. Adding firm foam inserts such as Tamiya's shaped inserts to softer-compound wide tires can remedy the flexing problem, and that in turn increases traction.

Tamiya
M-2 Radial
and Tozai
GT-12N tires all
have center ribs,
which really help out
when it's time to narrow.

The greatest disadvantage of wide tires, however, is that they weigh more than narrow ones. This not only increases a car's unsprung weight, but it also increases its rotating mass. These are two critical areas in which weight plays an important role. Although you can only reduce unsprung weight by a certain amount before a car will show some instability, the more you can reduce rotating mass the better. In short, lighter tires equal greater off-the-line and out-of-the-corner punch. According to Kent, the only real advantage to wider tires is that they look cool on your car. You will find, though, that most of the fast guys run standard-width tires in the rear.

1 Cut the tire along the middle, using the rib as a guide.

2 Narrow the tire by trimming approximately $\frac{1}{16}$ inch off the edge of each tire half. Removing about $\frac{1}{8}$ inch from the middle would be ideal, but you can experiment by removing more to make the tire even narrower, or remove less to make the tire just slightly narrower. The choice is yours.

3 Carefully reglue the halves using a medium CA. You could use thin CA for a quicker bond, but I like the medium because it gives me more time to get things straight before it dries permanently. You need to be patient and very careful when you reglue the halves.

4 Trim the foam insert to make it fit inside the narrower tire. If the tires didn't come with foam inserts, buy some. You must use foam inserts inside your homemade narrow tires, or they will come apart in one run.

5 After you've trimmed the foam insert, try it on for size before gluing the tire to the wheel. The main thing to look out for when you trial-fit the foam insert is that it doesn't bulge up inside the tire.

6 Glue the tire to the outside edge of the wheel—not the inside edge. Most wheels have mounting channels for the tire's beads to rest on (extra support). You'll be able to glue the tire's outside bead to the wheel's outer mounting channel, but you'll have to glue the tire's inside bead directly to the wheel without support from the wheel's inside channel. This is not a problem; just use plenty of CA around the inside and outside beads when you glue the tire to the wheel.

You can also narrow the wheel. This will not only make it look better, but will make it perform better as well. To narrow the wheel, fit the tire on the wheel (without glue) to see how much material you must cut off. Draw a line with a marker, using the tire as a guide. Next, remove the tire and cut the excess off the wheel with a Dremel* tool that's equipped with a cut-off wheel or by using a hacksaw. After you've cut the wheel, sand the edges smooth.

touring car tire guide

TAMIYA

- **Super Slicks**—part no. 53220, \$21 (standard); 53228, \$21 (wide).
- **Super Grip Radials**—53231, \$21 (wide).
- **Radial Tires**—50419, \$11 (stock kit tires).
- **M2 Radials**—53227, \$13.50 (standard).
- **M2 Slicks**—53224, \$14 (standard).
- **M-Grip Super Slicks**—53178, \$16.50 (standard).
- **Racing Slick Tire Set**—50454, \$11 (stock kit tires).

Most Tamiya sedan kits come either with Standard Racing Slicks or Standard Racing Radials. These tires perform quite well with stock motors, but they usually don't last very long. In competition, these tires are rarely used. I've used all of Tamiya's tires at one time or another, and here's what I've discovered.

The best combination for touring sedans is standard-width Super Slicks in the rear and standard-width M2 Radials in front. This tire combination will give your car excellent traction



**Tamiya Shaped
Tire Insert (soft).**



**Tamiya Super Grip
Radial (narrow).**



**Tamiya Super
Slicks (narrow).**



**Tamiya Super
Slicks (wide).**



**Tamiya M2
Radial (narrow).**

and excellent steering. The tires didn't come with foam inserts, so I used the Tozai Model Factory Hard Foam Inserts (SP-13) for a firm feel. Another great thing about these tires is the wear factor. You can get 12 to 20 good runs out of them before you'll notice any substantial performance degradation. My only complaint is that they cost a bit more than some of the other tires I tested, but they're well worth the extra cash.

Another excellent Tamiya tire is the Super Grip Radial. This is the stickiest treaded tire in Tamiya's entire line. It is an excellent choice for smooth and slippery surfaces, and when combined with Tamiya's Shaped Tire Inserts (53250—soft, 53209—hard; \$9.50), it is hard to beat.

Belted Tires

Touring car tires have risen to a new level of sophistication with the recent release of belted tires. Shown here is Kawada's* new Super Narrow Belted Slick tire (part no. LS-210). This tire is reinforced with an inner fiberglass cloth belt that increases life and improves performance.

ADVANTAGES

• **Wear evenly.** The inner belt promotes even wear, regardless of the car's camber and caster settings. This is because the tire's contact patch remains consistent regardless of chassis roll and suspension travel. No more wearing out the edges of your tires!

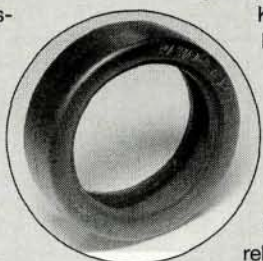
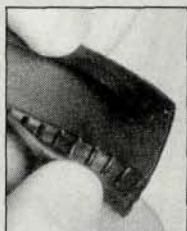
• **Don't expand as much under acceleration.** This is a major benefit because the car's gearing will be the same on all parts of the track. Tire expansion plays a major role in battery efficiency, and let's face it: how many times have your batteries dumped on the last lap of the race? With

belted tires, you can gear your car properly, and you won't have to factor in the valuable seconds you lose because of tire expansion. Another benefit is that the contact patch remains consistent, and this means better high-speed stability.

• Corner better.

The belted tires have reinforced, ribbed sidewalls that work with the fiberglass cloth belt. The sidewalls will not flex or roll over when the car corners, so cornering is greatly improved.

Kawada offers both radial and slick belted tires, and they also have them in standard and wide configurations. Yokomo recently released slicks with a fiberglass cloth reinforcement. Maybe other companies will join in and manufacture belted tires. What about fiberglass-cloth reinforced off-road tires? Interesting topic!



YOKOMO

- **High Grip Slicks**—ZR-052, \$11.95 (wide).
- **Hyper Grip Slicks**—ZR-058, \$18 (super-narrow); ZR-057, \$19 (wide).
- **High Grip Radials**—ZR-080, \$11 (standard).
- **Hyper Grip Radials**—ZR-081, \$13 (standard); ZR-082, \$17 (super-narrow).

The new Yokomo super-narrow Hyper Grip Slicks are approximately 1/8 inch narrower than standard-width tires, and this results in an extra-quick response in the corners. These slicks are super-soft and provide lots of traction on smooth tracks with normal to high-bite characteristics. They take a few runs to get used to, but after a few laps, you'll agree that they're great for racing—especially on tracks with tight

turns, where that extra edge in cornering is important. Their only drawback is that you must use either the Yokomo super-narrow wheel (for Yokomo only), or cut the outer groove off other manufacturers' wheels to use them. Rumor has it that other manufacturers are also



**Yokomo Hyper Grip
Slick (narrow).**

working on super-narrow tires and wheels. Although these are a great set of tires to

have in your arsenal, they do wear out rather quickly. In my tests, I got only 8 to 10 runs before they started showing substantial wear.

This can get expensive because of their rather high suggested retail price. As for the other Yokomo tires, the Super Narrow Hyper Grip Radials are hard to beat on rough surfaces. They offer all the benefits of the super-narrow Hyper Grip Slicks, but because they're treaded, they really bite down on rough and dusty parking lots. If you use them in front with the Hyper Grip Rear Tires (narrow or super-narrow), you can expect to experience quite a bit less steering than with slicks in the front. The other Hyper Grip tires (wide and narrow) seemed to have great traction as well and are more affordable.



**Yokomo Hyper Grip
Slick (super-narrow).**



**Yokomo Hyper Grip
Radial (super-narrow).**

Many thanks to the following companies. This article would not have been possible without their advice and support: Yokomo, Kawada, Pro-Line, Tozai Model Factory, HPI, Tamiya and Kyosho.

*Addresses are listed alphabetically in the Index of Manufacturers on page 173. ■

Showdown at the

O.K. CORRAL

by Jack Johnson

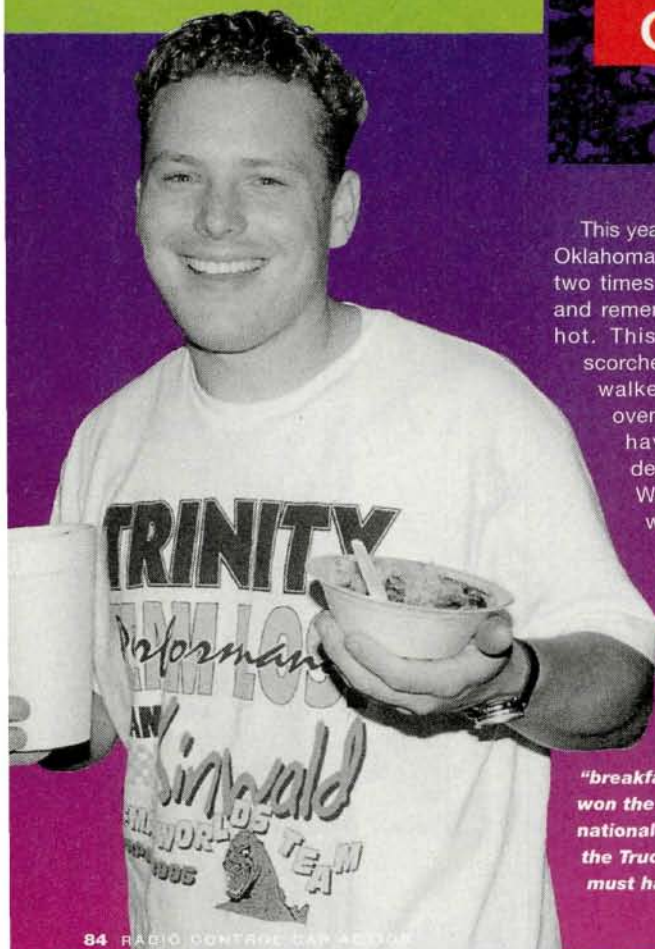
THE NORRCA Nationals is one of the most prestigious annual events in off-road racing. This year's event—with 376 entrants—was no exception. NORRCA structures its classes differently from the other racing organizations, and in doing so separates the Factory teams (or at least the “big guns”) from the other racers. NORRCA has established rules that don't allow prototype parts in classes other than Factory. This makes for a more level playing field in the Expert and Sportsman classes. This successful combination of level competition in the Expert and Sportsman classes and the Factory class shootout is the result of an experiment by J.R. Sitman, president of NORRCA, at the 1994 Nationals.

PHOTOS BY JACK JOHNSON



NORRCA

OFF-ROAD NATION

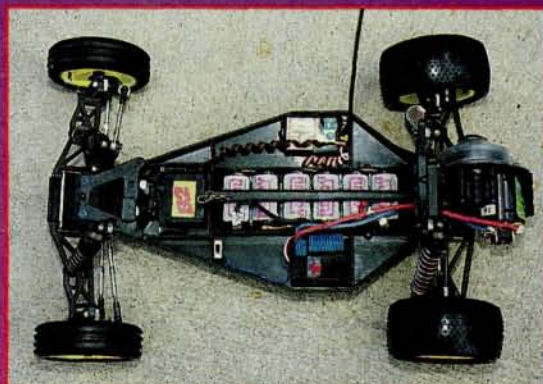


This year's event was hosted by RCRC of Oklahoma City. I had been to this facility two times in the past during the summer and remembered the weather being very hot. This year proved to be another scorcher. When I arrived at the track, I walked into what felt like a toaster oven—no kidding; it must have been over 100 degrees in the building. Worse yet, the humidity was oppressive. I looked around and noticed that there

Why is Greg Hodapp so fast, you ask? Well, boys and girls, it's because he eats his Wheaties. After eating a nutritional

“breakfast of champions,” Greg won the NORRCA Factory national championship in both the Truck and 2WD classes. He must have eaten two bowls!

weren't too many racers in the pit area. It seemed that more than half of the participants had taken advantage of the close proximity of the hotel and decided to pit out of their rooms in air-conditioned comfort. I spent about an hour at the track and headed for cooler air. Later on, as I watched the



Gabe Boudreau's Expert 2WD Modified winning Team Associated RC10B2.

Team Trinity/Team Losi's Greg Hodapp was the man to beat in the Factory 2WD and Truck classes. shown are Greg's Losi XX-T 'CR' (left) and XX 'CR' (right).



was, "Yeah, but that's outside with a breeze. I wonder what the heat index is in that building?"

QUALIFYING HIGHLIGHTS SPORTSMAN

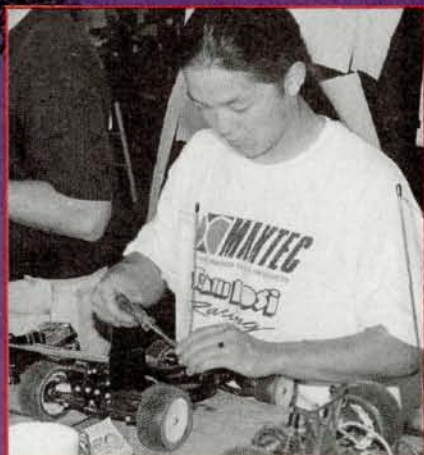
With the classes divided the way they are, the Stock, or Sportsman, classes give a racer a chance to gain experience at a national event. These classes don't allow a driver to be sponsored in any way. The Sportsman Modified classes are also specifically for non-sponsored, privateer drivers.

- 2WD Stock T.Q.: Gary O'Brien.
- Stock Truck T.Q.: Ryan Dawson.
- 2WD Modified T.Q.: Gary O'Brien.
- Modified Truck T.Q.: Ryan Dawson.

EXPERT

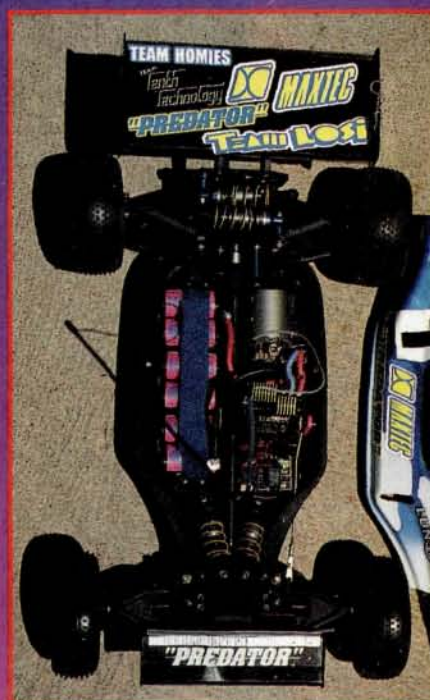
In this, sponsored drivers do battle using stock motors. The motors are not handouts, so the motor manufacturers also battle it out for bragging rights in these classes.

- Modified Truck T.Q.: Jimmy Babcock.
- 2WD Stock T.Q.: Jimmy Babcock.
- Stock Truck T.Q.: Jimmy Babcock.



Derek Furutani smoked the competition in the Expert 4WD class; no one else came close. Derek easily won all three A-Mains.

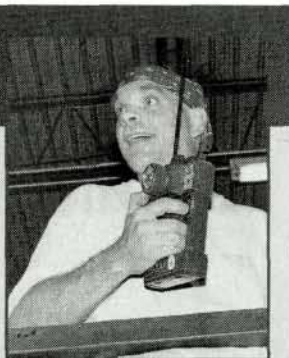
news from the comfort of my hotel room, I discovered that there is a term similar to wind-chill factor that is used to describe the opposite end of the spectrum—heat index. The actual temperature was "only" 95 degrees, but with the humidity, the heat index was 111 degrees. My first thought



Derek Furutani's Expert 4WD class winning Tenth Technology Predator.

Da Hand that Drives Da Car

As I watched some of the Qualifiers, someone said, "Hey! Watch this guy, this car right here." As I watched the car go around the track, I noticed it was cruising. I was truly amazed when I was told to look up on the drivers' stand and saw its driver was driving with one hand! I had seen this before, but usually only when a person had a cast on one arm, or was physically challenged in such a way that he couldn't use both hands. This driver appeared to have two fully functional hands, and he was smiling from ear to ear and seemed to be having more fun than just about anyone. I had to talk to this guy and get the story.



Gary "Da Hand" Struckhoff.

Later, I had a chance to catch up with Gary "Da Hand" Struckhoff and found out that he once had a high-paying, high-stress job. One day, he realized he wasn't enjoying life and decided to quit. He went to work for \$6 an hour for a friend and started to enjoy himself for the first time. Soon afterward, he bought an R/C off-road car. Once he had finished building his car, he built a track in his backyard. For several months, he continued to drive alone after work until he realized there was a commercial track in his town. One day, he packed up his things and headed out to size himself up against other racers. When he arrived, he was shocked to see that everyone else drove with two hands. When he asked whether anyone else drove with one hand they said, "What, are you crazy?"

"Why did you start driving with one hand?" I asked him. "Did you have a cast on your other hand when you started?" "No! When I got home from work and headed out to my backyard to drive, I always had the transmitter in one hand and a cold drink or a cigarette in the other," he replied. He's 40 years old and lives in St. Louis, MO, and he says he's having the time of his life. He tells me that this is the most enjoyable hobby he has ever had, and it shows. He has more fun than any two racers combined. When he's taking his turn as corner marshal, he can often be heard yelling, "Good luck, racer dudes!" Gary's ultimate R/C dream would be to race against Masami Hirotsuka using one hand while Masami drives with his feet.

NORRCA OFF-ROAD NATS

- Stock Truck T.Q.: Jimmy Babcock.
- 2WD Modified T.Q.: Gabe Boudreau.
- 4WD Modified T.Q.: Derek Furutani.

FACTORY

While the Factory classes ran, it was difficult to find an open spot to watch from, let alone a seat on the bleachers. There's no doubt about it, the drivers were talented, and the racing was very competitive. The factory teams work hard to win the coveted titles in these classes. They also work hard to win the "team challenge" that NORRCA holds with the Factory classes. Every team picks five drivers—two in one class and three in the other—to represent them in the points battle. After every round of qualifying, points are awarded to the drivers of a particular team according to their overall qualifying position for that round. The team competition adds a little excitement to the Factory classes, and it's more fun for the drivers. Sometimes, as he tries to keep track of the points from round to round, I wonder whether J.R. wishes he had never started this competition.

- 2WD Modified T.Q.: Greg Hodapp.
- Modified Truck T.Q.: Mark Pavidis.

ON THE INFORMATION SUPER

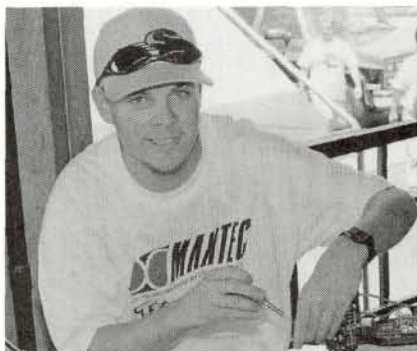
Cursor to the button, Pedal to the metal

On the information superhighway there are no speed limits. When you log onto the Serpent TSN Internet web site, you move into the fast lane of cyber R/C: Detailed information on car dynamics and tuning, timely race reports, even a racer forum for you to discuss R/C subjects on a global scale. The only real limits are how fast you want to go, and how much fun you want to have.

If you're into R/C, check out the Serpent TSN internet site. Because the track isn't the only place where Serpent is speeding.



<http://www>



Jimmy Babcock almost entirely dominated the Expert classes. He won Stock Truck, Mod Truck and 2WD Stock.

MAINS ACTION

With 11 classes, seven of which ran triple A-Mains, we were in for a long day of Main events. The questions in everyone's mind were: would Jimmy Babcock continue his domination of the Expert classes? Could Derek Furutani go 14 laps? Would anyone be able to catch Mark Pavidis in Factory Truck? Did anyone have a chance against Greg Hodapp in Factory 2WD? And just how hot would it get in the building?

With the exception of the Sportsman classes, all A-Mains would consist of three

Mains using the point system. The two best finishes of each driver would be combined to determine the winner. The Sportsman drivers would have only one Main to make their charge to the front of the pack and claim the title of national champion.

SPORTSMAN

• **2WD Stock.** Gary O'Brien took advantage of his position as TQ, and he and Greg Emeterio left the rest of the field behind. Gary captured the win and the national title, finishing 2 seconds ahead of Greg. Brandon Holmes moved up from his qualifying position of fourth to finish third.

• **Stock Truck.** Local youngster Ryan Dawson protected

Team Trinity/Team Losi's Brian Kinwald finished second overall in Factory 2WD behind teammate Greg Hodapp, but when it came to the Factory Truck class, he didn't have as much luck. Two "hard-luck" Mains combined with one win relegated him to sixth overall.

his pole position as he and Kyle Rowland battled for the lead in the early stages of the race. Eventually, Ryan built a comfortable 3-second lead to take his first national championship. Kyle finished in second, while Sean Kreis fought his way from seventh qualifier to finish third.

• **2WD Modified.** Gary O'Brien led this one wire-to-wire and was never challenged. He captured his second national title, with Brandon Holmes finishing second and Matt Perrier third.



HIGHWAY... WE'RE SPEEDING



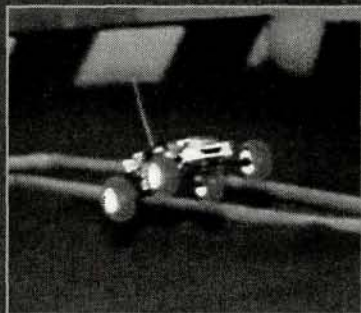
- Car set-up articles
- Track guides and set-ups
- Downloadable files
- Latest products info
- Race calendar and reports
- Links to R/C internet
- Experts' columns
- E-mail with the team
- PC race competition
- Prize-winning quiz
- and much more.....



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SERPENT USA, Inc. Miami, Florida

The Hot New Track



The track for the '96 NORRCA Nats was challenging. Built into a 50x100-foot area, it contained many obstacles. On the end nearest the drivers' stand the main straight ran the length of the track. At the end of the straight was a 90-degree right-hand turn that headed into a tabletop jump. After recovering from the tabletop landing, you had to set up for another 90-degree right-hand turn that led into a monster triple jump that wreaked havoc with the best of drivers. From there, it was a 180-degree turn to the right into a left-hand 180-degree carousel turn that set you up for the biggest jump on the track—a huge double jump. It seemed the Stock class drivers geared their motors to suit this part of the track. Clearing the big double was critical. One missed jump and the A-Main might be unattainable. After the double, there was a 90-degree left into a slight "S" that ended in about a 100-degree right-hander that sent you through the whoop section from hell! Then it was a hairpin right into the final S-turns that led back to the main straight. The surface was very hard-packed and held up well. Traction was more than fair; it seemed most drivers were plenty hooked up with either Pro-Line M2 Flat Fuzzies, or Team Losi Silver IFMAR Pins. The front tires of choice were Team Losi HT Wide Bodies.

When I arrived at the track for Qualifying, I noticed that it was much brighter inside the building. The large lights over the track were off during practice. When I asked about this, I was told that the track dries out too quickly when the lights are on. In my two previous trips to RCRC, the track had been more of an "old-style" surface. In the early heats, the surface was smooth and had awesome traction. As the day went on, the track deteriorated. In both of my past visits, the TQ times were set during the first round of qualifying because in the later rounds the track "went away" too badly to yield the fast times.

This time, the track was prepped differently. More water was used and the surface was packed down so much that there was very little loose dirt. In practice the only thing I noticed was that small ruts developed in the apex through the S-turns and high-speed corners. Would the track hold up through all four rounds of qualifying? We would find out soon enough.

NORRCA OFF-ROAD NATS

• **Modified Truck.** TQ Ryan Dawson was the victim of the dreaded first-turn pileup, and this allowed second qualifier Gary O'Brien to take the lead. Ryan found himself in the back of the pack with quite a few trucks between him and the leader. He eventually worked his way up to third, behind Kyle Rowland. Gary O'Brien captured the win and his third title of the weekend. I think we may see Gary in the Expert classes next year.

EXPERT

• **2WD Stock.** Jimmy Babcock led the first Main for the first 3:30, and then he tangled with a lapped car, and Rhett McNair slid into the lead. Rhett finished first, and Jimmy second. Jimmy went on to take wire-to-wire wins in the second and third Mains, locking up the overall win and his first of what could be many national titles. Rhett McNair finished in third overall with first- and second-place finishes. Rounding out the top five were: Albert Guardado, third (second and third); Alex Marzurkawycz, fourth (third and fifth); and Chad Bradley, fifth (third and fifth).

• **Stock Truck.** Jimmy Babcock took the win easily in the first Main, finishing 5 seconds ahead of Chad Bradley. The second Main was different, though. After fighting off a persistent Albert Guardado and crossing the finish line just ahead of Albert, Jimmy wrapped up his second title with victories in the first two Mains. Could Jimmy keep his streak going? Albert left the field in the dust in the third Main and finished second overall, with first- and second-place finishes. Chad Bradley finished in third (2 seconds), Gabe Boudreau in fourth (third/fourth) and Jade Kurtchi in fifth (third/fourth).

• **2WD Modified.** TQ Gabe Boudreau led the first Main from start to finish. Jason Schweitzer made several charges, but never had enough to get past Gabe. In the second Main, Wes Kasper challenged Gabe as the two swapped the lead several times. Wes eventually pulled away as Gabe ran into trouble and finished in last. Jimmy Babcock made an attempt at winning a third class by finishing second in the second Main and third in the final Main, but Gabe wrapped it up with a second victory in the final Main. The overall standings had Gabe in first (two wins), Jason Schweitzer in second (two seconds), Jimmy Babcock in third (second/third), Wes Kasper in fourth (first/sixth) and Todd Hodge in fifth (two fourths).

• **Modified Truck.** Jimmy Babcock was on a mission. He won the first Main event by a half a lap over Albert Guardado. In the second Main, Wes Kasper kept it closer, finishing just 2 seconds behind Jimmy. In the third Main, with the absence of Jimmy, Wes went on to win by 5 seconds over Gabe Boudreau. Having won the first two Mains, Jimmy wrapped up his third national title. Jimmy has won a few national titles in oval racing, but these were his first off-road titles. If he drives as he did here, he just might find himself in the Factory classes next year. Completing the top five were Wes Kasper (first/second), Albert Guardado (second/third), Gabe Boudreau (second/third) and Jade Kurtchi (third/fifth).

• **4WD Modified.** Derek Furutani had the field flat-out covered. He won the first two Mains and finally got his 14-lap run in the second one. After he had clinched the overall win in the first two Mains, he opted not



Team Associated's Mark Pavidis (right) nabbed the TQ in Factory Truck. Mark had to settle for second place overall after battling it out with Team Trinity/Team Losi's Greg Hodapp, who took first.

to sit out the third, and won that as well. A very convincing win to say the least. Finishing second overall was Greg Dennett with two seconds. During the third Main, Matt Lee was in position to take second overall when his right rear wheel fell off. He showed he was a good sport by just laughing and walking off the drivers' stand, settling for second overall. Finishing in fourth and fifth were Jeff Wittman and Kurt Wenger.

FACTORY

• **2WD Modified.** Greg Hodapp was out to win—period! After dominating Qualifying, he went on to win the first two Mains. In the second Main, Brian Kinwald made the competition exciting, finishing only 1 second behind Greg. Brian won the third Main convincingly to take second overall. Sohrab Tavakoli came all the way up from the eighth starting position to take second- and fourth-place finishes and earn third

Race Results

Expert 2WD Stock

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires(F/R)	Traction Additive	Pinion/Spur
1	1	Jimmy Babcock	Losi	Maxtec	Maxtec	Novak	Airtronics	Losi	Losi/Losi	none	22/84
2	2	Rhett McNair	Assoc.	Fantom	Badd Boyz	Tekin	Airtronics	Protoform	Losi/Pro-Line	XXX	23/81
3	3	Albert Guardado	Losi	Peak Perf.	Orion	Novak	Airtronics	Losi	Losi/Losi	none	19/88
4	5	Al Marzurkawycz	Losi	Warlock	Racers' Edge	Tekin	Airtronics	Losi	Losi/Losi	none	23/84
5	4	Chad Bradley	Assoc.	Reedy	Reedy	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	Assoc.	23/81

Expert Stock Truck

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires(F/R)	Traction Additive	Pinion/Spur
1	1	Jimmy Babcock	Losi	Maxtec	Maxtec	Novak	Airtronics	Losi	Losi/Losi	none	22/87
2	2	Albert Guardado	Losi	Peak Perf.	Orion	Novak	Airtronics	Losi	Losi/Losi	none	21/88
3	4	Chad Bradley	Assoc.	Reedy	Reedy	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	Assoc.	20/87
4	3	Gabe Boudreau	Assoc.	Maxtec/Reedy	Sanyo/Orion	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	none	21/87
5	5	Jade Kurtchi	Losi	Extreme	World Class	Novak	Airtronics	Losi	Losi/Losi	none	21/88

Expert 2WD Modified

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires(F/R)	Traction Additive	Pinion/Spur
1	1	Gabe Boudreau	Assoc.	Reedy	Sanyo/Reedy	LRP	Airtronics	Assoc.	Losi/Pro-Line	none	19/81
2	3	Jason Schweitzer	Losi	Fantom	Fantom	Novak	Airtronics	Losi	Losi/Losi	Trinity	21/84
3	5	Jimmy Babcock	Losi	Maxtec	Maxtec	Novak	Airtronics	Losi	Losi/Losi	none	21/84
4	4	Wes Kasper	Losi	Trinity	Trinity	Tekin	Airtronics	Losi	Losi/Losi	Trinity	20/87
5	2	Todd Hodge	Losi	Scooter	Perf. Match	Tekin	Airtronics	Losi	Losi/Losi	Trinity	22/84

Expert Modified Truck

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires(F/R)	Traction Additive	Pinion/Spur
1	1	Jimmy Babcock	Losi	Maxtec	Maxtec	Novak	Airtronics	Losi	Losi/Losi	none	20/87
2	2	Wes Kasper	Losi	Trinity	Trinity	Tekin	Airtronics	Losi	Losi/Losi	Trinity	19/87
3	7	Albert Guardado	Losi	Peak Perf.	Orion	Novak	Airtronics	Losi	Losi/Losi	none	19/88
4	4	Gabe Boudreau	Assoc.	Reedy	Sanyo/Reedy	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	none	19/87
5	10	Jade Kurtchi	Losi	Extreme	World Class	Novak	Airtronics	Losi	Losi/Losi	Tom's Juice	20/88

Expert 4WD Modified

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires(F/R)	Traction Additive	Pinion/Spur
1	1	Derek Furutani	Tenth Tech	Maxtec	Orion	Tekin	Airtronics	Tenth Tech	Losi/Losi	none	19/70
2	3	Greg Dennett	Kyosho	Reedy	Reedy/Orion	LRP	Futaba	Kyosho	Pro-Line/Pro-Line	none	n/a
3	2	Matt Lee	Yokomo	Maxtec	Badd Boyz	Tekin	Airtronics	Yokomo	Losi/Losi	none	19/87
4	6	Jeff Wittman	Yokomo	Maxtec	Dbl. Strike	Tekin	Airtronics	Yokomo	Pro-Line/Pro-Line	none	18/84
5	5	Kurt Wenger	Schumacher	Reedy	Reedy	Tekin	Airtronics	Schumacher	Losi/Pro-Line	XXX	16/92

Factory 2WD Modified

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires(F/R)	Traction Additive	Pinion/Spur
1	1	Greg Hodapp	Losi	Trinity	Trinity	Tekin	Airtronics	Losi	Losi/Losi	Trinity	22/84
2	2	Brian Kinwald	Losi	Trinity	Trinity	Tekin	Airtronics	Losi	Losi/Losi	Trinity	20/84
3	8	Sohrab Tavakoli	Losi	Peak Perf.	Orion	Novak	Airtronics	Losi	Losi/Losi	Trinity	20/84
4	5	Scott Brown	Losi	Trinity	Trinity	Novak	JR	Losi	Losi/Losi	none	23/84
5	3	Mark Pavidis	Assoc.	Reedy	Reedy	LRP	Airtronics	Assoc.	Losi/Pro-Line	Assoc.	20/84
6	4	Scott Hughes	Assoc.	Reedy	Reedy/Orion	LRP	Futaba	Assoc.	Losi/Pro-Line	none	19/81
7	9	Richard Saxton	Assoc.	Reedy	Reedy	Novak	Airtronics	Assoc.	Losi/Pro-Line	Assoc.	n/a
8	10	Jimmy Jacobson	Assoc.	Reedy	Reedy	LRP	Airtronics	Assoc.	Losi/Pro-Line	Assoc.	19/81
9	7	Derek Furutani	Losi	Maxtec	Orion	Tekin	Airtronics	Losi	Losi/Losi	none	25/84
10	6	Billy Easton	Assoc.	Reedy	Reedy/Orion	Tekin	Futaba	Assoc.	Losi/Pro-Line	none	19/84

Factory Modified Truck

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires(F/R)	Traction Additive	Pinion/Spur
1	3	Greg Hodapp	Losi	Trinity	Trinity	Tekin	Airtronics	Losi	Losi/Losi	Trinity	20/88
2	1	Mark Pavidis	Assoc.	Reedy	Reedy	LRP	Airtronics	Assoc.	Pro-Line/Pro-Line	Assoc.	18/87
3	6	Brian Dunbar	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Losi/Losi	none	18/88
4	5	Sohrab Tavakoli	Losi	Peak Perf.	Orion	Novak	Airtronics	Losi	Losi/Losi	Trinity	18/87
5	7	Alex Guerrero	Losi	Peak Perf.	Orion	Novak	Sanwa	Losi	Losi/Losi	Trinity	19/88
6	2	Brian Kinwald	Losi	Trinity	Trinity	Tekin	Airtronics	Losi	Losi/Losi	Trinity	18/88
7	10	Matt Lee	Losi	Maxtec	Maxtec	Tekin	Airtronics	Losi	Losi/Losi	none	22/88
8	8	Derek Furutani	Losi	Maxtec	Orion	Tekin	Airtronics	Losi	Losi/Losi	none	18/88
9	9	J.D. Beckwith	Assoc.	Reedy	Reedy/Orion	Novak	Airtronics	Assoc.	Pro-Line/Pro-Line	none	18/87
10	4	Richard Saxton	Assoc.	Reedy	Reedy	Novak	Airtronics	Assoc.	Pro-Line/Pro-Line	Assoc.	n/a

Sportsman Class

Sportsman 2WD Stock

Fin.	Qual.	Driver
1	1	Gary O'Brien
2	2	Greg Emeterio
3	4	Brandon Holmes
4	10	Richard Yarber
5	7	Nathan Aker

Sportsman Stock Truck

Fin.	Qual.	Driver
1	1	Ryan Dawson
2	2	Kyle Rowland
3	7	Sean Kreis
4	4	David Taylor
5	3	Marc Simon

Sportsman 2WD Modified

Fin.	Qual.	Driver
1	1	Gary O'Brien
2	2	Brandon Holmes
3	6	Matt Perrier
4	3	Nathan Aker
5	8	Michael Perrier

Sportsman Modified Truck

Fin.	Qual.	Driver
1	2	Gary O'Brien
2	3	Kyle Rowland
3	1	Ryan Dawson
4	4	Chad Haskel
5	5	Russ Wehnau

New in the Pits

Badd Boyz

Anodized Aluminum Parts for the B2 and T2

A complete line of "Badd Stuff" for the RC10B2 and T2 is available. Some of the parts are machined, aluminum-billet T6 and others are custom-anodized aluminum in blue, purple, green and yellow. Other goodies include top front braces, servo mounts, front cross-braces, front kick-up plates, rear chassis plates, motor mounts, shock caps and front axles. Most of the Team Associated drivers outfitted their cars with various Badd Boyz parts to make them look "badd to the bone."



RaceTech



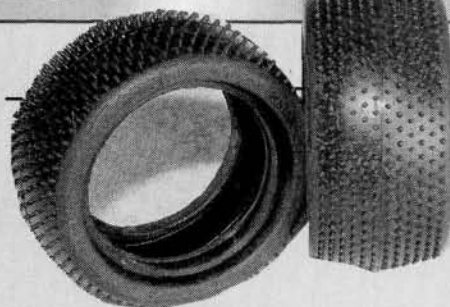
Timing Gauge

A convenient tool (part no. 3001, \$7.95) to check the timing on modified motors.

Although many motors come with stickers that have timing indicated on them, the labels can be inaccurate. The gauge takes the guesswork out of timing adjustments. It is marked in 2½-degree increments up to 45 degrees in both forward and backward directions. Because of the "box" design, you can use it as a handy motor holder while soldering capacitors as well!

Stock Motors and Velocity Modified Motors

Team drivers for RaceTech* used the Velocity modified motors and the stock motors. Stock motors are available in both 24- and 30-degree configurations. Velocity motors come with three factory-installed capacitors and hard-compound race-ready motor brushes. The hard-compound brush minimizes commutator wear while producing plenty of horsepower. The Velocity motors are available in a wide range of winds, from 10-turn through 16-turn.



Two New Treads

The new Diamond-pattern rear tire from Losi* has tons of small diamond-shaped lugs. At first glance, the lugs appear to be round, but a closer look reveals that they are shaped like diamonds and are turned at 45-degree angles. These tires appeared during the first day of Qualifying, so few drivers wanted to take a chance on an unknown tire. Those who tried it claimed that the tire had very good traction.

Team Losi

overall. In the third Main, Scott Brown charged hard, and finished second. Combined with his fifth-place finish in the first Main, Scott took fourth overall. Mark Pavidis finished fifth overall with a third in the second Main, and a fourth in the third Main.

• **Modified Truck.** So far, most of the day's questions had been answered. Jimmy Babcock went on to win the three Expert classes that he had TQ'd, Derek indeed went 14 laps, Greg Hodapp had proved he was the man to beat, and yes, today was the hottest day in that building yet. The only remaining question was, could anyone beat Mark Pavidis in Factory Truck? This turned out to be the most exciting event of the weekend.

In the first Main, Mark shot out in front and built up a substantial lead. Brian Kinwald got into second and, with some hard-charging, closed the gap, but he could not overcome Mark's big lead. It looked as

if Brian would take second place easily, but after Qualifying, the track crew had moved the scoring loop from the S-turns to the straightaway. Everyone was informed of this and it hadn't so far been a problem. When the horn sounded, Mark crossed the line to take the win, but Brian ran into the pipe past what had previously been the finish line and then he walked off the stand. A turn marshal pushed Brian's truck across the line, but this wasn't legal. Everyone else continued to cross the finish line and end the Main. Because Brian's truck hadn't finished under its own power, he wound up in seventh place.

At the start of the second Main, Brian was a little upset and was out to prove something. As he worked past Mark and into the lead it seemed that nothing would stop him. A few turns later, Brian landed after the triple jump and coasted to a stop. Apparently, the negative wire had come off his battery pack. When it rains, it pours; this just wasn't Brian's day. Mark was the

victim of a multi-truck pileup and finished a hard-fought sixth.

When things settled down, Greg Hodapp crossed the line with the win ahead of teammates Brain Dunbar, Alex Guerrero, Sohrab Tavakoli and Matt Lee. Going into the third round, three drivers had realistic chances of winning: Mark Pavidis, Greg Hodapp and Brian Dunbar. The horn sounded and all 10 trucks left the line and stayed clean around the first turn. It looked as if Greg had the fastest truck. He was sticking his nose inside of Mark's truck on every turn, waiting for the opportunity to pass him. As the two crossed the line and completed the first lap, Mark was no more than 1 foot ahead of Greg. The pair rounded the first turn and headed for the tabletop jump. Greg was too close to Mark and bumped him as they went airborne. Mark's truck rolled onto its lid as Greg, Brian and Sohrab drove by. Suddenly, the announcer called a false start and stopped the race.

(Continued on page 170)

HOW TO

Care for Your Batteries

Prolong pack life through proper maintenance

by Stan VanDruff

I STILL use batteries that I bought in 1991. OK, so they're practice packs now, but I am still a long way from being one of those high-falutin' sponsored racers who use a battery once and then throw it away! Wouldn't you like your batteries to last longer and perform better at the same time?

To properly charge your cells, a peak-charger is the best way to go. There are two basic types: AC/DC and DC-powered units (the Tekin BC 67 unit on the bottom has a built-in power supply, while the others do not). If you purchase a DC-powered peak-charger, you'll need a 12V power supply to run it.

CONFESSION

I don't claim to know all the answers. Even Sanyo and Panasonic (they make the cells that go into our battery packs) don't have all the answers. We R/C'ers push our batteries in so many different directions that there is simply no single best way to maintain them.

One thing I do know is that you have to make a trade-off between performance and

Terms:

Battery bug—a small, inexpensive, resistive load that automatically cuts off when battery voltage drops to a certain level. Some people use resistors, but resistors never cut off.

Bumping (also called re-peaking)—topping off the charge on an already fully charged battery. It warms the battery and ensures that it is charged to the max. Excessive bumping can ruin a battery by overcharging it.

Charging—duh, filling the battery with energy so that your car will run.

Discharging—draining the energy from the battery. More specifically, it means draining the charge left after a race.

Dump—depletion of the battery's charge, especially if it happens before a race is over and you can't finish.

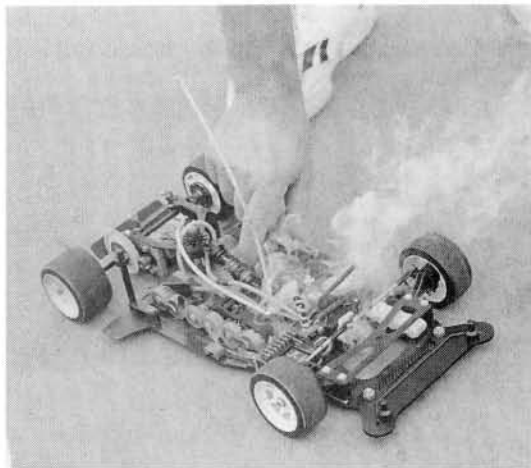
Matched pack—the 6 or 7 cells that make up a battery pack and are chosen to have nearly identical voltages, amperages and run times. Matched packs charge more evenly and maintain maximum voltage longer than unmatched (random match) packs.

Memory—the effect when improperly charged or discharged batteries no longer hold a full charge.

Peak—the point at which a battery is fully charged and its voltage is at its highest. As a battery is overcharged, its voltage actually decreases. Peak chargers detect the peak and stop charging when it has been reached.



Re-matching your cells helps keep them in tip-top shape. If you're serious about your cells, you should re-match them once a year.



Be careful not to short-circuit your batteries. They get extremely hot and can start a fire!

longevity. To get the longest life from your batteries, you must give up a little performance; for top performance, you give up a little battery life.

CONFUSION

Everyone I talk with treats batteries differently. Some store their batteries fully charged while others store them discharged with a battery bug (see "Terms" sidebar) on them. Still others say this is the worst thing you can do. And some R/C'ers swear that the key is having the right brand of charger/discharger/battery conditioner. Turbothirty owners on CompuServe are fiercely loyal to Competition Electronics*.

With so many different opinions, you have to be confused. But everyone with an opinion has a half-dozen success stories to back him up. It can't be just luck. How can so many different treatments work so well?

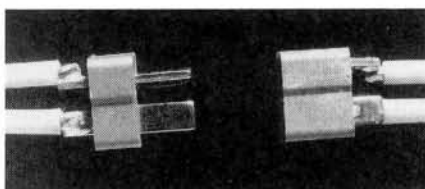
CONSISTENCY

Here is the common thread: be consistent. All successful racers follow their battery maintenance rituals religiously. Race after race, year after year, they treat their batteries in exactly the same way. Start your own ritual today.

First, buy a good battery charger, preferably a name-brand peak charger; expect to pay \$75 to \$150. Those who race outdoors can use a DC charger,

which costs a few bucks less than a comparable AC/DC model. Next, buy or make a discharger. Most racers I know get by with a light-bulb discharger. If you don't feel qualified to make one, you can find a fellow racer to build one for you or buy one of the pre-built ones sold by companies such as Hobby Warehouse* and Deans*. Discharging after a race takes only a minute (if that), so two or three racers may be able to share a discharger.

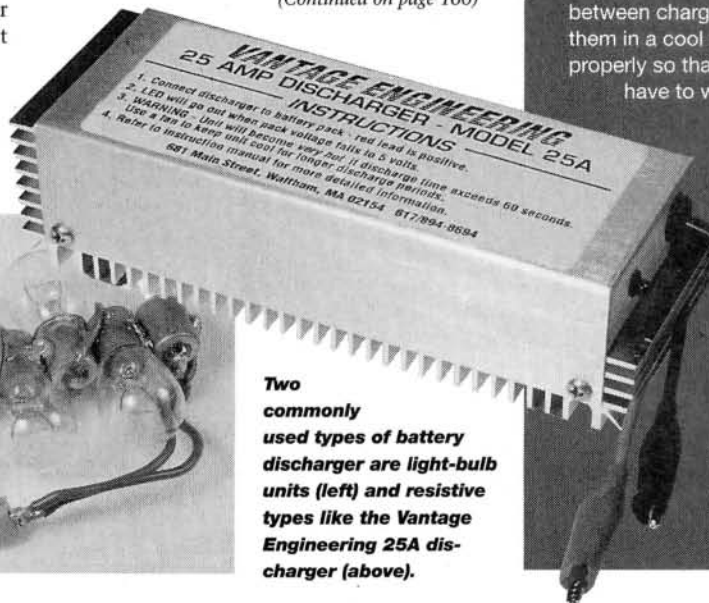
Start with a cool battery, and charge it completely. Just before a race, bump it (see "Terms" sidebar) once, maybe twice, for



Low-loss connectors such as these Deans Ultra Plugs offer less resistance than most standard (Tamiya-style) connectors; to get the most out of your batteries, you might want to ditch your standard connectors and switch to low-loss connectors.

a little extra oomph. After a race, discharge it to 0.9 volt per cell. If you don't plan to use a charged battery for three days or more, discharge it before you put it away. Store your batteries discharged, even if it's only so that you'll know their state when you take them out again. Lots of people ask about storing batteries with battery bugs on them. Battery bugs are probably harmless, and my best buddy has great luck with them. But I doubt that they offer any real benefit, so I've never used them.

(Continued on page 166)



Two commonly used types of battery discharger are light-bulb units (left) and resistive types like the Vantage Engineering 25A discharger (above).

Do's...

- **DO use a peak-charger.** That is the best way to avoid overcharging.
- **DO discharge completely.** Discharging completely at the same rate as your car draws power from the battery prevents it from developing memory. Use 20 amps to 30 amps depending on your application. Make or buy a special-purpose discharger.
- **DO charge at a consistent rate.** Use the same settings on the charger each time you charge. Don't change from day to day or race to race.
- **DO match your cells.** Matched cells take a charge more evenly and provide longer run times at full voltage.
- **DO condition your batteries annually.** Rematching your batteries once a year is one way to compensate for minor damage. Another way is to charge your batteries with a reflex charger like the Tekin* BC112. Of course, if you or your club can afford them, professional battery conditioners are available.
- **DO use low-loss connectors.** Resistance in a cheap connector will lower the motor voltage and slow you down.

Dont's...

- **DON'T overcharge.** This includes bumping too often. Overcharging will cause the electrolyte to evaporate, and this will lead to irreversible damage.
- **DON'T let batteries overheat.** Heat is the enemy. It accelerates chemical degradation. Allow batteries to cool between charge cycles, and store them in a cool place. Gear your car properly so that the battery doesn't have to work too hard.
- **DON'T short-circuit your battery.** Shorted batteries get extremely hot and can start a fire (and be ruined).
- **DON'T throw your old batteries into the trash.** Ni-Cds contain toxic chemicals and should be disposed of through a recycling facility.

by Chris Chianelli

Break In and Care for Your

Cool Blue Trails

The powerful alcohol-burning glow engine (often referred to as a nitro engine because of the 10 to 20 percent nitromethane that is added to its fuel as an oxygenator) has certainly demonstrated its ability to bring new levels of excitement to our hobby in terms of blinding speed and sheer horsepower. Is there a flip side? Of course; there always is.

To the newcomer to piston power, the potential for failure at least equals the potential for success, and minor setbacks can leave the neophyte feeling extremely disappointed and totally frustrated. But before any of you write off the glow engine as a creation of the underworld put here to torment mortal modelers, believe this: it absolutely does not have to be that way. Countless people are having a grand old time with glow power, and I can guarantee you the same enjoyment and success—if you gain a basic understanding of why the glow engine works the way it does and you form some simple good habits—especially early on, when the engine is brand new.

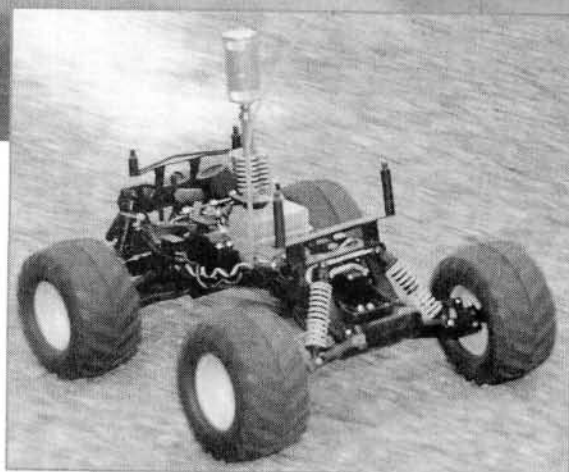
GET IT IN YOUR HEAD...NOW!

You must know how to treat your new engine during those first few runs; I can't overemphasize the importance of this. How you break in a new engine can make the difference between enjoying the power of glow engines and cursing them for all time. Anyone can run these little gems successfully if you just do what you're supposed to do. If you want to do things your way instead, I suggest you trade in your precision glow engine for some SCRC cells now while it's still worth something!

Before I get into any of the specifics about glow engines or breaking them in, I want you to reprogram the way you think. If you forget everything else, remember this: don't think of your engine as air-cooled, think of it as liquid-cooled. Yes, it has cooling fins, and of course, passing air does take heat away. However, other than making sure that sufficient air is getting to the engine, you have little control over the amount of air cooling that's taking place. The weather (heat and humidity) has a substantial effect on that, and we all know how powerless we are over Mother Nature. If you keep this in mind, you will develop an intuitive "feel" for how to treat your crankshaft dynamo from this time on.

HAS HE LOST IT?

So now comes the question: "What the hell does that idiot Chianelli mean by 'liquid-cooled'?" Just this; you know those cool-looking, blue/white smoke trails that a well-tuned gas car leaves behind as it negotiates the race track? Well, much more is being left behind than just smoke. Part of that smoke is oil and unburned alcohol—a



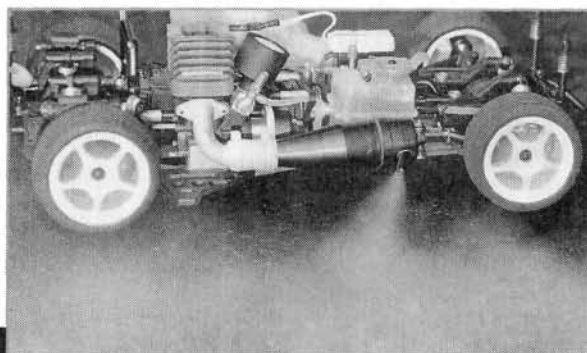
To prevent my engine from stalling during those first rich break-in runs, I leave the glow-plug igniter attached to the glow plug. Some feel this shortens glow-plug life, and that may be true; however, I believe it's a good idea to install a new plug after the break-in period is up anyway.

liquid combination that extracts tremendous internal heat from the running engine and expels it out the exhaust. And the amount of oil and unburned alcohol that's coming out of the exhaust pipe is something we have significant control over by means of the needle valve.

Here's another bit of reprogramming: don't think of the needle valve only as an air/fuel mixing device to tune for optimum rpm setting. Think of it also as the cooling system's thermostat—much like the thermostat in a full-scale car's cooling system, except that it's not automatic: we have control. In the case of the 2-stroke glow engine, closing down (leaning the mixture) too much by turning the needle valve clockwise shuts off the vital coolant (the fuel). Luckily, the modern 2-stroke glow engine was designed to expel some of the fuel unburned. The radical porting of today's glow engines allows for a slightly

PHOTOS BY WALTER SIDAS

Glow Engine



Engines equipped with tuned pipes tend to leave a thicker trail than those not so equipped. If your engine has a stock expansion-chamber muffler, don't expect your trails to be quite as prominent. Personally, I think all car engines should be supplied with a tuned muffler instead of an expansion-chamber unit. Engines run stronger, more reliably and cooler, and they last longer when used with them. Yes, the manufacturer may have to increase price slightly, but in the long run, it's well worth it in terms of both performance and engine longevity. If your engine doesn't have a tuned pipe, I strongly recommend that you equip it with one.



Our exec. editor Frank Masi (right) wears a faint smile of tranquillity because he has studied diligently, one-on-one with the Grand Master Motor Magi himself. This commitment has brought him peace and harmony in the study of Jeet Kune Glo... The Way of the Heat, or is it The Away of the Heat?

rich cooling mixture (a larger ratio of fuel in the air/fuel mixture), while still allowing high levels of horsepower.

This "running wet" concept, as some call it, is very important to remember whenever you run your glow engine—especially if you want it to last and give good service for a reasonable length of time. Moreover, it is absolutely crucial that you practice the "liquid-cooled" mindset during the break-in process of a brand-new engine.

FUEL ISN'T "JUST FUEL"

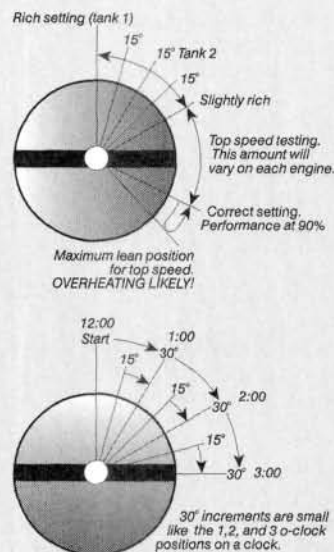
Quite frankly, a lot of the information that has been passed out about fuel is either outright bogus or has trickled down from the on-road 1/8-scale racing scene. One-

eighth-scale races are run on smooth, low-resistance surfaces, and the engine heads stick way out of the cars, so they're air-cooled because they're moving at 40 to 60mph! This is a far cry from the conditions under which we everyday backyard monster-truck bashers and stadium racers run: we encounter higher rolling resistance (dirt and sand) and run at lower speeds (thus, lower cooling-airflow speed). Plus, these guys in 1/8 scale are often factory-sponsored or have money to burn. Maybe this will tell you something. It's not uncommon for them to show up to a race with four or five backup engines.

It's this simple: if manufacturers recommend a certain percentage of lubricant for their engines—stick to it religiously. O.S.* and Thunder Tiger* recommend no less than an 18-percent-lubricant fuel for their engines, and Enya specifies 20 percent for break-in and 15 percent for running. Don't let any self-appointed "expert" talk you into second-guessing the designers of these engines. The factory guys know what the heck they're talking about. And remember this: it's the manufacturers who back your warranty. They have the option to honor or void your warranty as they see fit. So...who do you think you should listen to? The manufacturer or big-mouth Joe know-it-all-about-everything?

Furthermore, I would only use a fuel by a manufacturer who tells you on the label exactly what the lubrication volume is as a percentage. If they feel they need to keep the ingredients of their particular brand of synthetic oil a secret, OK, fair enough. But to keep the percentage a secret?! I can't imagine any reason why they would do

"Needling"



Here are two diagrams from Traxxas's very good Nitro Stampede instructions. Needle sensitivity varies greatly with engine brand; Traxxas says it even varies from sample to sample with their own engines. I show this diagram only to give you a general "feel" of how prudent you need to be when making adjustments. The 12-o'clock position is where you start from after you've turned the needle valve counterclockwise (from fully closed) the number turns recommended in the instructions.

Pre-Run Checklist for Success

For the successful operation of a glow engine, you first have to get the thing started! I mention this only because I know that many run into trouble at this preliminary stage. Here again, if a few simple rules are followed, start-up is assured.

✓ **Know the Facts.** Check to see that the glow plug is glowing brightly (a bright yellow-orange, not a dull orange) then make sure your starting battery has a fresh charge on it. Thirdly, prime (or choke) the engine with high-quality fuel. At this point, it's gotta start.

✓ **Read the instructions!** Every engine is a little different, especially in terms of carburetor adjustment. Read the manufacturer's instructions, then go back and read them again. Then go back and read the section on break-in and running at least three more times! You'll save yourself a lot of stress and probably lots of unnecessary repair bills.

✓ **Check the glow plug.** Some are under the impression that the glow plug should be changed every 40,000 miles or two years—whichever comes first. Well, we're talking glow plugs here, not spark plugs...ALL RIGHT! The plug should be checked before every running session. It's easy: remove the plug and connect it to the igniter battery. Look for that bright yellow/orange glow of the coil element; it will be visible even in direct sunlight.

If your engine is not starting or performing correctly, try changing the plug. Even if the plug is glowing as it should, it still may not be functioning up to par—especially if it's old. Try another plug (a new one! This is not time to be cheap). I've often found a faulty plug to be the culprit. Inspect it often and consult the instructions for the correct type. Don't use an idle-bar type designed for airplane use just 'cause it's on sale for 99¢.

✓ **You need a good igniter.** When it comes to the glow-plug igniter battery, some still seem to be satisfied with that cylindrical, 10-inch-tall dry-cell that says "Hobby Battery" on its label and has been sitting on the shelf for 10 years in a discount chain store. Go to the hobby shop and get yourself a new rechargeable plug igniter and charge it according to the instructions. Don't buy your "good buddy's" used one for five bucks! This isn't the place to go for The Cheapest Man In Town world title...OK?!

You also might want get one of OFNA's glow igniters that uses C-size dry cells. Not only would this be good as a back-up to your rechargeable, but it's a good unit on its own delivering 1.5 volts over the 1.2 volts of a Ni-Cd (not to mention the fact that a "fresh charge" is as close as the nearest convenience store). In any case, a lot of headaches disappear if you're prepared in the glow-igniter department.

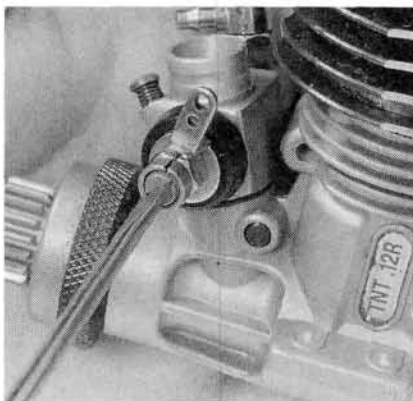
this. I mean, what do they think? Do they think that YOU CAN'T HANDLE THE TRUTH?! Don't let anybody tell you it's an "industry secret," man. You don't want the "mystery blend" passing through your expensive engine. What you want is peace of mind. You want to know your precision powerhouse is properly protected!

A blend of synthetic and castor oil has proven to give excellent all-around protection. Castor has taken some hits lately because, unlike the fuels of some years ago, less than AAA-grade of castor is being used, and it varnishes more easily. As long as you don't use a fuel with all castor, varnishing won't be a problem. If a fuel's "oil package" (the amount of lubricant in the fuel—usually between 15 and 18 percent) contains 5 percent castor, the fuel will provide adequate protection against lean running and corrosion—castor's strong point. As for nitro content, stick to 15 percent. Don't go over 20 percent, or you're asking for reduced engine life. Most engine manufacturers, but not all, advise that you break in your engine on the same fuel as you intend to run it on. Again, you'd be wise to follow their recommendations and turn a deaf ear to contradictory pontificators.

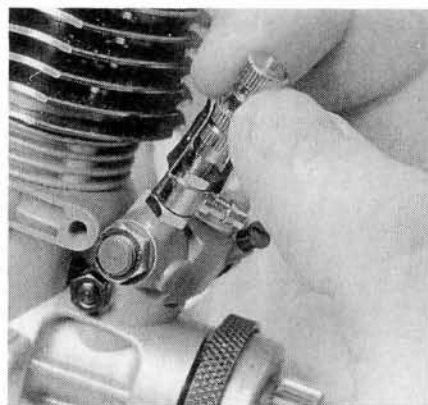
BREAK-IN PROCEDURE

Before you even fill the tank for the first time, read the instructions one more time!

• **Selecting a break-in site.** You might be saying, "What difference does that make?" It can make the difference between a well broken-in killer engine and total ruination. I don't care if your nitro-burner is off-road buggy, a stadium truck or a monster truck. You want to break it in on a smooth hard surface that offers as little rolling resistance as possible. Running the vehicle in grass or soft sand for the first runs is highly discour-



This is the low-end mixture-adjustment screw on the TNT .12R. Counterclockwise makes the mixture richer; clockwise makes it leaner. During break-in, you probably won't be messing with this adjustment too much since the high-end adjustment (the one you will be messing with during break-in) has a direct effect on it.



This is the high-end mixture-adjustment screw on the TNT .12R. During break-in, you'll be concerning yourself, for the most part, with this needle valve. Like the low-end adjustment, it, too, makes the mixture leaner when turned clockwise and richer when turned counterclockwise.

aged. Resistance causes heat, and heat, especially during the crucial break-in period, is the enemy!

I know you're probably worried about running your pin-spoke tires on a paved surface; just go easy on the break-in runs. You're not in a race—yet. Anyway, pin-spikes are far less expensive than a new engine. If you can, try to pick a spot that's relatively clean. Also, try to pick a day that's not too hot and humid. If that's not feasible, try to break in the engine in the morning or in the afternoon when it's cooler. If you can find some shade, that would be moooost excellent.

FIRE IT UP!

• After you've filled the tank, check the instructions to be sure that the high-end needle valve is opened the recommended number of turns. This is done by screwing the needle all the way in then opening it the correct number of turns (counterclockwise). Every engine is different, so double-check the instructions. If they say two turns, I usually go 2¼ turns. The extra ¼ turn richens the mixture further, and although it's probably not necessary, it can't hurt at this vital point.

• Put a few drops of fuel into the carb (some fuel tanks have a built-in pump primer that's very convenient).

• Set the throttle at about ¼ open.

• Connect the glow igniter.

• Fire it up.

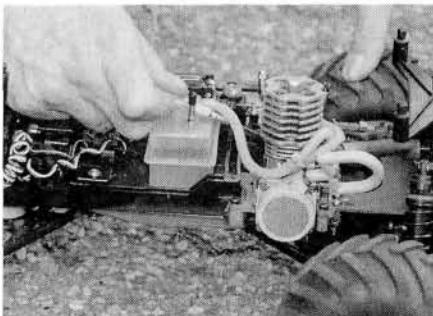
Once the engine starts, rev it a little bit (not to full throttle) while holding the rear tires off the ground, if it's a 2WD. If it's 4WD, you'll have to hold the whole car off the ground. Do this only for 15 to 20 seconds to warm up the engine. Don't do this for extended periods because you want to get the car moving around to get air moving

over the cooling fins.

Do not expect the engine to run very well during the first three or four tanks of fuel. Acceleration will be sluggish, and don't expect anything even close to a good idle during initial break-in. Don't worry about getting the engine to idle slowly enough for the car to come to a complete stop. You don't want to stop it anyway. You want to keep it moving for optimum air cooling.

Hopefully, the area you've chosen is large enough to keep the car moving and the engine running fast enough to keep it from stalling. Remember, the fuel mixture should be set for break-in (rich, so that there's more fuel in the mixture), not for optimum performance, throttle response or idle. This comes later when the engine is broken in, running cooler and can be more easily adjusted.

Running rich may cause your engine to stall a lot. Don't get frustrated; this is normal. A richly set engine often quits when the glow igniter is removed. To get through the early break-in runs, I sometimes leave



Having the proper tool for a specific job will make your experience of running gas engines much more enjoyable.

the igniter in place to keep the plug hot and the engine running. Some believe this shortens the life of the glow plug. This may be true, but guess what?: the glow plug probably isn't going to be in the greatest shape after the break-in runs anyway, because rich settings often leave deposits on the plug's coil, so the plug should be replaced after break in has been completed anyway.

- **Flooding.** With an initially rich setting, there's always the chance of the engine becoming flooded (when raw, unburned fuel collects in the crankcase). How can you tell when your engine is flooded? It will be more difficult to turn over (pull-starting, or cranking with an electric starter), and it will pop (fire, but not start) and kick. Don't keep turning over an engine in this condition. You could over-stress the pull-starter mechanism or, if you use an electric starter, you might damage the engine's conrod.

To fix a flooded engine, disconnect the igniter battery, close the high-speed (main)



needle valve all the way, pick up the car so that the exhaust port faces the ground, and then crank the engine over. Any raw fuel that has collected in the lower crankcase will spill out through the port. Some people remove the glow plug, too. If you do this, you'll see for yourself the raw fuel mix coming out through the plug hole. Now you can start over by screwing out the high-speed needle to a position that's $\frac{1}{4}$ turn or so less than the needle's position before the engine became flooded.

TWO MORE THINGS TO REMEMBER

There are two other things I want you to do during the four or five break-in runs. First, leave the body off the chassis so plenty of air can get to the engine. Next, don't run the tank all the way dry. Running the engine dry is never a good thing, and definitely not good during break-in. The mixture automatically leans itself as the tank level falls. When the tank has emptied to about $\frac{1}{3}$ to $\frac{1}{4}$ full, pull the car over and shut the engine off—preferably by closing the throttle barrel (or throttle slide, depending on which brand of engine you own) and throttle-trim all the way. Personally, I go a step further: even before I start the longer break-in runs, I run the car for three or four very short runs—which use no more than a $\frac{1}{4}$ tank of fuel—with 5- to 10 minute cooling periods in between. After that, I do the standard four or five longer $\frac{3}{4}$ -tank runs I just mentioned.

CONCLUSION

While running the car on a hopefully flat and shady parking lot, check for the blue/white smoke coming out of the exhaust. This should be the most noticeable when you accelerate and may not be as noticeable when you coast. Coasting is good, by the way; lots of cooling takes place.

Depending on the weather (heat and humidity), you can start leaning the engine slightly during the fourth and fifth runs. The engine should start showing some



You don't have to spend a fortune; however, organized support equipment (above) is key to the successful running of glow engines. Is your field gear orderly and neat, or does it resemble your bedroom closet floor? To see who's responsible for the mess on the left, turn to "Chris's Back Lot."

decent power while still leaving that smoke trail. At this point, try not to mess with the low-end needle valve, if you can. Any changes to the high-end needle-valve have a direct effect on the low-end needle, so don't fiddle with it during break-in. Concern yourself with the high-end needle in the very beginning. Yes, in isolated cases, the low-end needle may have somehow got so far out of whack that you'll need to refer to the instructions to reset it to a good starting point. As an engine comes out of the box from the factory, however, the low-end needle should be close enough for successful break-in running. Try to leave it alone during break in.

After running at least four tanks' worth of break-in (and I strongly recommend the preliminary shorter ones I mentioned earlier, too), refer to the manufacturer's instructions for final tuning and setup procedures



With OFNA's dry-cell glow-plug igniter, a fresh charge is as far away as the closest convenience store. Even if you have a rechargeable Ni-Cd glow-plug igniter, this unit is good to have as insurance. It can make the difference between going home early and annoyed (due to a dead Ni-Cd) and having a "gas" of a day.

that are appropriate for the carburetor specific to your brand of engine.

Good luck and remember: don't be in a rush to race! Be careful, be patient and stay cool.

**Addresses are listed alphabetically in the Index of Manufacturers on page 173.*



The Race Connection

Flight Deck Race

SPONSORED BY **Hobby Shack**

by staff



Maj. Yarnell takes the wheel for a spin around the track. Racing was brutal that day, but the Major (the only Marine on the ship) was ready for the challenge.

PHOTOS BY GARY BENDER



When you work with the Navy, you have to think big. The second biggest crane in the shipyard was used to lift the track onto the deck, which towered over five stories above the dock.

IT IS 5:35 A.M. AT LONG BEACH NAVAL SHIPYARD.

DAYLIGHT WAITS ON THE HORIZON. FIFTY EXPERTS PREPARE TO BOARD THE U.S.S. BOXER. THEY HAVE PLANNED THIS DAY FOR WEEKS—REVIEWED EVERY STEP AND PERFECTED EVERY

PROCESS. IN LESS THAN THREE HOURS, THEIR UNIQUE MISSION WILL BEGIN.





Racing on the deck was truly an awesome sight. Notice the superstructure behind the track. Being on deck felt more like being atop a parking structure than on a warship.



It takes a big staff to put on a race like this. Over 50 Hobby Shack employees were present. The Hobby Shack Blue Crew announced the event, coached the racers, repaired the cars and charged batteries all day long. Talk about determination!

They wore blue, but they weren't U.S. Navy. This team was the "Blue Crew" from Hobby Shack*. Their mission? To entertain the 1,000-strong crew and 300 dockworkers aboard the new carrier U.S.S. Boxer.

The story really began months before, when the Navy League support group was invited to ride on the U.S.S. Boxer.

PARKING-LOT RACES



Among those on board was Rick Pike, general manager of Hobby Shack retail stores. Inspired by the image of the massive ship, Rick had the idea of taking a Hobby Shack portable track on board.

Working on a ship can be tedious, and the crew needs diversions. Rick talked with U.S.S. Boxer recreation officers and asked to put on a race for the crew. The crew would race on a full-size R/C track with cars supplied by the company. The winner would receive a prize.

Rick went to the "captain" of Hobby Shack, Paul Bender, with the news. The Boxer's recreation officer, Maj. Ed Yarnell, proposed the idea to his executive officer,

Capt. Annis. With the approval of both "captains," the "Flight Deck Race" was born.

Hobby Shack personnel set up their parking-lot track on the flight deck, and 280 of the crew raced in 28 heats. The winners advanced to the semifinals and then to the final race.

Hobby Shack provided over 50 cars, and they were maintained by about 15 Blue Crew members. Tamiya* sedans and Traxxas* ready-to-run vehicles were used. Remember, most of the guys on the Boxer had never raced an R/C car before. Although many cars bravely withstood the challenge of 280 rookies, the carnage was unreal! Some vehicles had suspension arms and wheels ripped off. On others, the chassis and bodies were sanded away by the incredibly rough surface of the flight deck. For many vehicles, that day of racing was their last.

The Blue Crew set up a smaller, "try-me" track away from the main one. There, the crew used Traxxas Stampedes

(continued on page 172)

WHAT'S new

REEDY 'Z' Series Sonic2

This new large-commutator, off-road motor has an endbell molded of high-temperature-resistant, light, rigid endbell material; a vibration-absorbing brush-damping system that decreases brush float, increases motor efficiency, lengthens comm and brush life and reduces

brush bounce; a completely new can made of 1.4 material for a stronger magnetic field and with a vent system for additional cooling; a new high-temperature-resistant magnet; and a new armature with a dual-lamination design.

Part nos.—350 (12-turn double); 351 (11-turn double); 352 (10-turn double); 354 (11-turn quad); 355 (10-turn quad); **price**—\$90.

Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626; (714) 850-9342; fax (714) 850-1744.

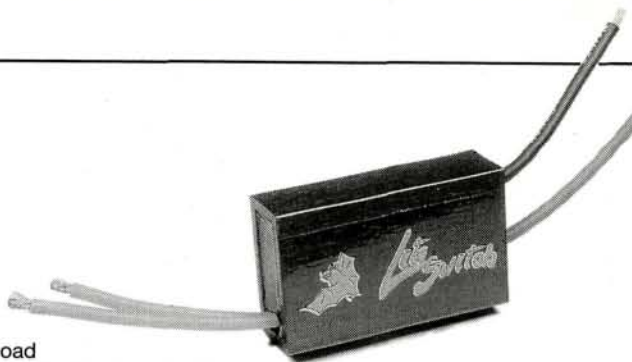


PERFORMANCE HOBBY Lite Switch

To safely handle your final discharge load, solder the Lite Switch to your 1A to 30A load and then plug it into your battery. The Lite Switch will "switch off" the discharge load as the battery voltage approaches the appropriate minimum.

Price—\$39.95.

Performance Hobby, 1293 N.W. Wall, Ste. 1492, Bend, OR 97701; (541) 389-6160.



NOVAK R/C Analyzer™

This analyzer allows testing of any ESC, servo and receiver/transmitter combinations. It features three testing modes, joystick control with fully adjustable settings, speed control BEC testing with adjustable loads, save and recall for up to 90 joystick settings, 32-character LCD display with contrast control, automatic cycle feature for speed-control and servo-testing modes and much more! The analyzer comes with two balanced ball-bearing motors, attached motor module, six adapters, an AC cord, a Novak plug conversion kit, operating instructions and a 90-day warranty.

Part no.—1002; **price**—\$500.

Novak Electronics Inc., 18910 Teller Ave., Irvine, CA 92715; (714) 833-8873; fax (714) 833-1631.

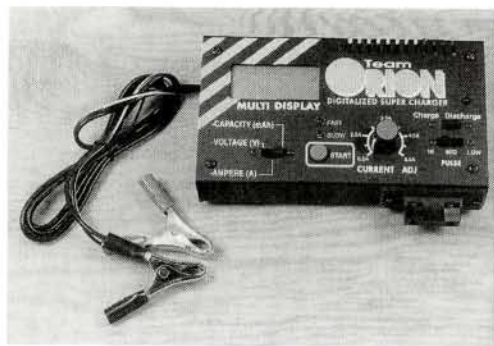


TEAM ORION Digital Super Charger

This new DC charger features a multi-function digital display, digital peak detection, a variable current-adjust function from a 0.5A to a 5.5A charge rate, a special pulse-rate charge mode, reverse-voltage protection, heavy-duty alligator clips and a discharge function.

Part no.—AT-3307; **price**—\$199.

Team Orion; distributed by Peak Performance, 23352-J Madero Rd., Mission Viejo, CA 92691; (714) 707-4683; fax (714) 707-4684.



RPM Hex Handles and Stand

These new color-coded hex handles will cut down on repair time and make general assembly and modification work hassle-free.

The precision tool-steel tips have been specially heat-treated to ensure durability. The wrenches are available separately and in a set of four with the stand, which includes red, blue, yellow and purple handles. The 7x3.5-inch black stand, also available separately, is hinged and will act as a display for your handles when you work on your car, or it will lie flat for easy storage in your toolbox.

Part nos. and prices—8066 (red—ball-driver-end, 2.5mm for motor screws), \$8.95; 8065 (blue—ball-driver-end, 0.093mm for 4-40 screws), \$8.95; 8064 (orange—2mm and 0.078), \$8.95; 8063 (yellow—0.062 for 4-40 flat-heads), \$8.95; 8062 (green—1.5mm), \$8.95; 8061 (purple—0.050 for pinions), \$8.95; 8069 (four-piece set with stand), \$34.95; 8070 (stand only), \$7.95.

RPM, 14978 Sierra Bonita Ln., Chino, CA 91710; (909) 393-0366; fax (909) 393-0465.

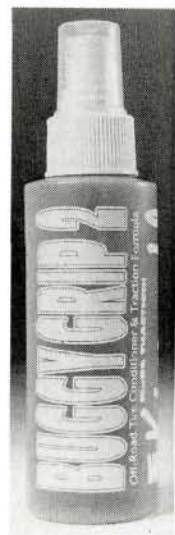


TRINITY Buggy Grip 2

This off-road tire conditioner has a new and improved formula with a blend of solvents that acts more quickly to promote faster softening. This formula is great for Team Losi and Pro-Line tires and will increase traction and provide more consistent performance. It will also help keep tires like new and help old tires stay supple.

Part no.—TK2003 (Buggy Grip 2 with sprayer); **price**—\$7.99.

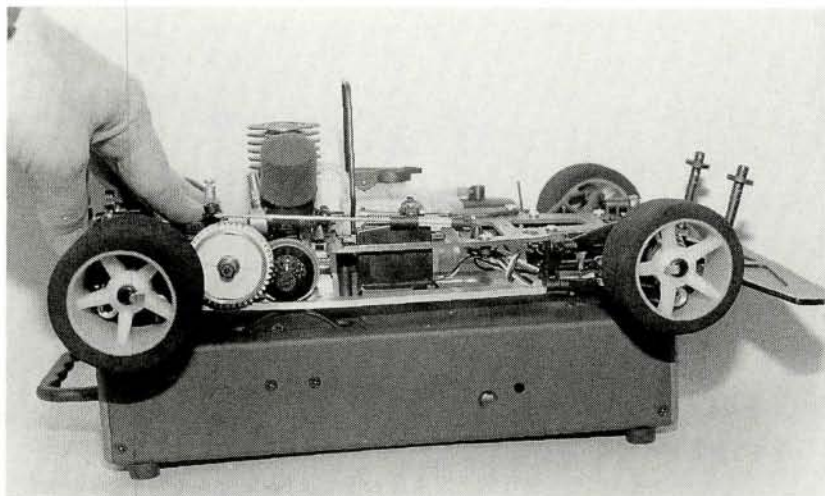
Trinity Products, 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.





by Doug Mertes

Serpent Powerstart



Just slide the front of the chassis plate into the front slot and push down on the rear bumper switch plate, and the starter wheel comes into contact with the fly-wheel just as the circuit closes and the wheel spins. It doesn't get any easier!

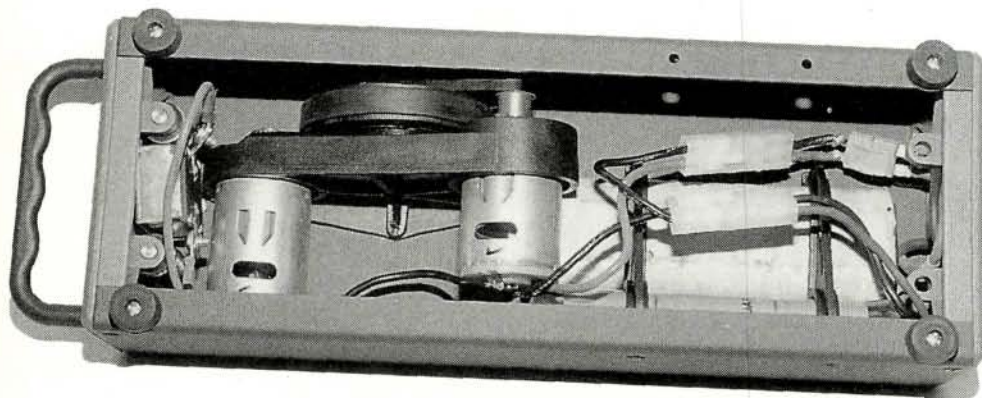
Cranking power for your gas vehicle

IT SEEMS that every time I go to the track with one of my nitro car buddies, we have to lug an incredible amount of stuff with us: the car, a jug of fuel, assorted tools, tires and spares, a transmitter, a tire durometer and a temp gauge. And last, but not least, we take a heavy, sharp-edged, ungainly, weirdly shaped starter box to get the whole thing running. More than once, I've cut my hand or torn a T-shirt on the metal corner of a friend's electric starter box. If your box stops working properly and you have to use someone else's, cross your fingers. It always seems as though your car won't quite fit the bump switch on the other guy's box, or the wheel doesn't come out of the box far enough to engage your flywheel, or some other situation puts your fingers in great peril of amputation.

Having recently decided to try gas on-road racing, I was more than a little concerned about having to haul all that stuff around, not to mention having to find, assemble and adjust the starter box. What a pain! But then I discovered that Serpent*—the company that manufactures the nifty Impact 2 1/10-scale on-road racing car that I've been spending a lot of time with lately—also makes the Powerstart Compact Starterbox (more about my Impact 2 adventure in a future issue). The Starterbox comes with bumper switch plates and chassis shoes that exactly fit the chassis of Serpent's popular Excel and Impact cars. Serpent also offers a kit that allows you to use this starter box to fire up just about any 1/10-scale gas truck on the market. So no matter which one you own or plan to buy, this box was designed to crank it up. I decided to snag one of these babies and give you the lowdown on how it works.

SMALL, LIGHT, LOGICAL

Most starter boxes are big, oddly shaped and heavy because they use a big, heavy, 12V DC wet-cell or gel-cell battery. Even "lightweight" batteries of that design weigh a whole lot. They're also typically designed around a conventional airplane



With everything installed, things are kind of crowded inside the box, but everything is neat, tight and well-organized.

starter motor that has a hard rubber wheel bolted to the front snout. These motors are like small automobile starter motors; they have major magnets, complex armature winds and lots of length, width and weight (do you see a trend here?).

Serpent's box, on the other hand, uses a pair of common, lightweight, 540-size, closed-endbell motors that are connected to the starter wheel by a pair of fine-pitch toothed belts that provide a substantial reduction ratio. That's how they get such small motors to spin a high-compression gas motor until it lights up. These motors are powered by a pair of garden-variety 6-cell Ni-Cd sport packs, wired in series so that you don't run out of amps until you're ready to call it a day.

The box is made of a rigid piece of stamped aluminum; at 12x4.5x2.5 inches, it's quite compact and contains all the components you'll need to get your ride's engine spinning. The box's upper deck was similarly well-designed. Serpent provides front chassis shoes and bumper switch plates for each of its Impact and Excel on-road cars. Slide the front of the car's chassis plate into the slotted nylon shoe that's bolted to one end of the box, press down on the rear end of the car, and it will engage the bump switch under the bumper plate that mates with the rear end of the chassis. This gives the engine's flywheel and the starter wheel a

This belt-driven starter-wheel system is quiet and light. Note the large bearings that support the drive shaft. Don't worry; those twin 540 motors can get even the gnarliest high-compression racing motor spinning!

nice, firm contact patch that allows the wheel to start the motor quickly and easily. The shoe and plate prevent the car from running away after the starter wheel has begun to spin. Pretty neat!

EASY TO BUILD

I found the Serpent Powerstart Compact Starterbox incredibly easy to build; it took me less than two hours from start to finish. The instructions are light on text but contain great line drawings that answer all your questions as you follow the pamphlet step by step. In typical

Serpent fashion, the parts are all beautifully molded and finished in black and purple nylon and aluminum that has a tough enamel coating. Huge bearings fully support the starter-wheel mechanism, which is nicely constructed so that only five screws hold the entire drive assembly inside the case. This makes it easy to remove the innards for maintenance and repair. The bumper switch fits well into the end of the box; two screws hold its switch plate on a pair of spring-loaded metal posts that ride smoothly in sockets in one of the end panels.

The two Ni-Cd battery packs that

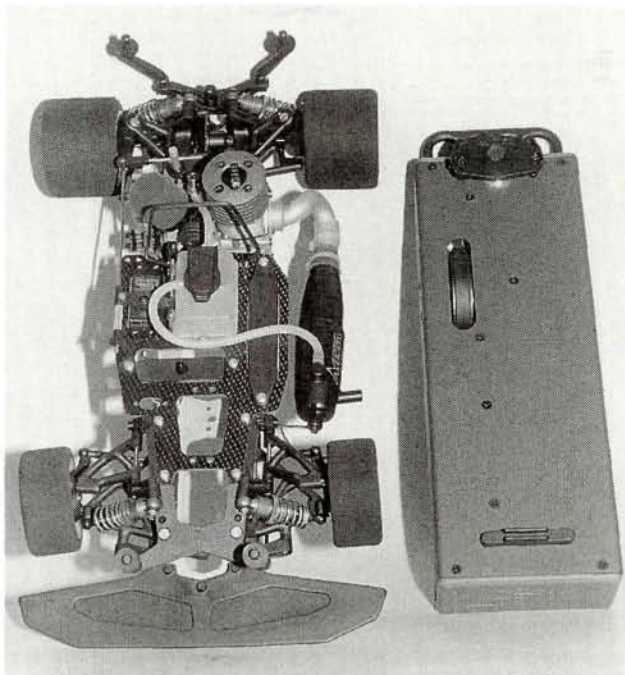
power the starter motor are firmly contained by two molded-nylon bulkheads that keep the packs tightly tucked out of harm's way. The pre-assembled wiring harness is simple to solder to the motors, switch and batteries, especially when you refer to the included wiring diagram. The entire box, which weighs only a couple of pounds, fits easily into your pit bag (no sharp edges!) or can be carried by the handle attached to one of the nylon panels. This is a high-quality product that you'll be pleased to use for a long time.

IS IT WORTH IT?

I'm very, very impressed with the Serpent Powerstart Compact Starterbox. Everything except the battery packs is included. If you're an old electric-powered-car guy like me, you already have a bunch of those lying around. I've also tried to use the box with several other brands of car, and it looked as though I'd be able to juggle the front chassis shoes and rear bumper switch plates that came with the Starterbox to make it work with most of the on-road cars I found. In a pinch, you could easily adapt or make front shoes and rear plates to fit your particular brand of car. Trust me; the trouble would be well worth it!

Is this something you should add to your gas arsenal? In my opinion, absolutely! Sure, you'll still have to drag all the usual stuff to the track with you, but your starter box will weigh less than half as much as most of the ones on the market, and it will cause you a lot less pain!

**Addresses are listed alphabetically in the Index of Manufacturers on page 173.*



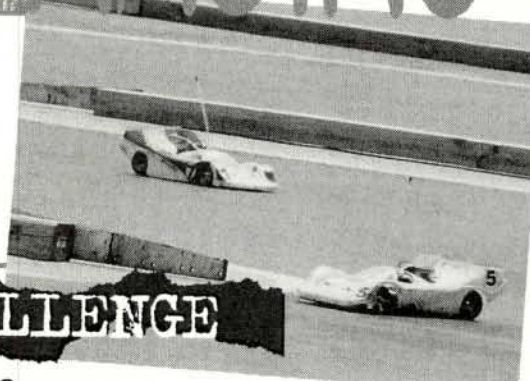
See how small the box is? That's a 1/10-scale Impact 2 sitting next to it! Most starter boxes are twice as big and heavy.

From the track to the parking lot.
This is the R/C action as **you** see it.

Grassroots

RACING

This is YOUR PAGE! That's what "Grassroots" means; go on, look it up. You know we're right. Which other magazine gives its readers an entire page to strut their stuff? Where else can you show the world—yes, everywhere from here to there—what you and your R/C friends are doing? Wanna brag? Here's the spot. Show us your local racing scene! Send photos with captions to "Grassroots Racing," *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606.



SERPENT IMPACT CHALLENGE

by MIKE MYERS

Held in Miami, FL, this was the first race in the Serpent Impact Challenge Series, which will include five regional events. The top 10 drivers from each regional race earn the right to compete in the USA Grand Finals. The winner of that race and one lucky, randomly selected racer will be Serpent's guests at the Impact World Grand Finals in Heemstede, the Netherlands, on December 13 to 15.

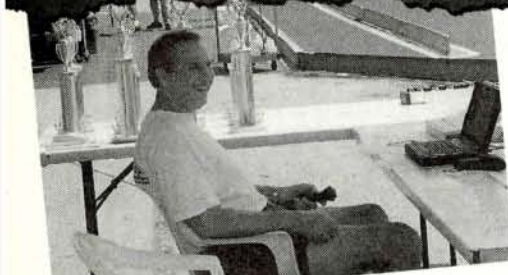
The rules are simple: the event is open to any sport racer; no factory-sponsored racers are allowed to compete; ROAR and EFRA rules apply; and racers must use Serpent Impact cars with Serpent Mega engines.

Before the first race got under way, Art Carbonell demonstrated how to set up a Serpent car. The track crew prepared the track by blowing it off and spraying it with sugar water. The racers set up tents to protect themselves from the sun, track officials set up the computer scoring system and, by mid-morning, everything was ready. The heats were set, and two rounds of qualifying with two races per round were planned.

Qualifying went very smoothly, with Gus Bustamante taking the TQ honors. The 20-minute Mains were planned for after lunch, and nine racers made it to the A-Main: Dave Aarons, Ledo Aguero, Gus Bustamante, Willie Carrera, Andre Saunders, Justin Schroeder, Tony Schroeder, Jim Rice and Gary Wiggins. The race got off to a smooth start, but then several cars tangled in front of the scoring computer. Unfortunately, the computer had a problem, and the race had to be restarted. The second start was much smoother and was also accident-free. Tony was in the lead with Ledo and Gary within snapping distance of his bumper. As the Main wound down to a close, the finishing order seemed pretty well decided, but then Tony's car lost its rear drive belt on the final straight-away, and that took him out of the race. Ledo went flying by to take the win, followed by Gary, Andre, Jim, Gus, and Willie.

Overall, it was great race weekend. We look forward to the rest of the Series.

Counterclockwise from top: Ledo's white Serpent just ahead of Andre's; Ed Enberg announces the A-Main; Tony Schroeder's car burns up the track; the winners (left to right): Dave, Tony, Gary and Ledo; the drivers' stand; the racers and their cars.



call now!

Whether you're a dealer or just a bunch of fun-lovers in search of a race program, call now! Here are a few hotline numbers to call if you have any questions, or if you'd like to start a program in your area.

Bolink Legend Series

(404) 963-0252

Tamiya R/C Championship Series

(800) TAMIYA-A

Kyosho R/C Sport Racing

(800) 682-8948
ext. 085F

Hobby Shack Parking Lot

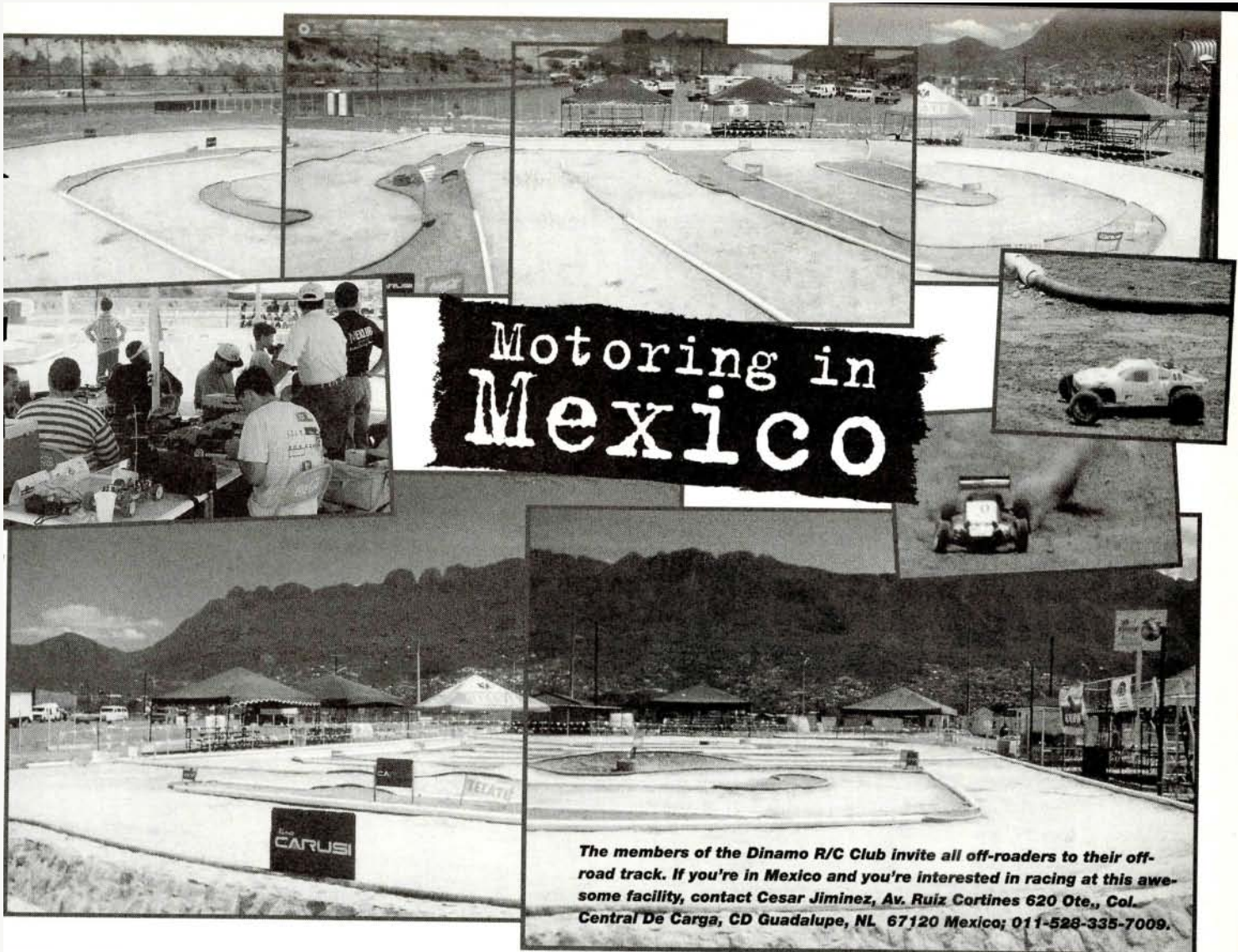
(714) 964-8846

Hobby Town USA Parking Lot

(402) 434-5050

Trinity's Street Spec Series

(908) 862-1705



Motoring in Mexico

The members of the Dinamo R/C Club invite all off-rovers to their off-road track. If you're in Mexico and you're interested in racing at this awesome facility, contact Cesar Jimenez, Av. Ruiz Cortines 620 Ote., Col. Central De Carga, CD Guadalupe, NL 67120 Mexico; 011-528-335-7009.

TCS Race 27-Aliso Viejo, California



Seventy-seven racers (left) and 27 spectators turned up at Tamiya America's Aliso Viejo track for yet another fun-filled day of racing. The winners (below) took home various prizes—everything from medals to car kits.

Best of Show

F-1	Anthony Fung
FWD	Ron Bechard
4WD	Fernando Salias
Truck	Roy Mayes
Mini	Roy Alaán

Top Rookie

4WD Eric Paley

F1

- 1 Mark Rebeck
- 2 Jason Davis
- 3 Russell Johnson

FWD Sedan

- 1 Joe Houda
- 2 Fred Medel
- 3 Tom Watana

4WD

- 1 Mike Allen
- 2 Bob Sager
- 3 Randy Cook

4x4 Truck

- 1 Fernando Salas
- 2 Jay Jaffee
- 3 Roy Mayes

Mini

- 1 Ray Alaán
- 2 John Houda
- 3 Mike Haehn



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Part no. AC 1001

For more information, contact:
Aero-Car Technology Inc.
P.O. Box 336
Western Springs, IL 60558
(708) 246-9027

BATTERY CARE

(Continued from page 103)

Once your battery has been discharged, you can use an equalizer tray to further enhance its performance. Equalizer trays hold the battery so that each cell has a 5-ohm, 1/4-watt resistor across it. Store the battery in the tray overnight (eight to 12 hours) to allow the cells' voltage to slowly even out. Unfortunately, I don't know of any equalizer trays for end-to-end (stick pack) battery packs.

CONTROVERSY?

Peak chargers pretty well remove the mystery from charging batteries, but nothing is as heated as a discussion about discharging. Novices ignore discharging while pros spend hours trying to perfect it. Here is my two cents' worth on discharging.

Everyone (including me) recommends that you fully discharge your battery at the same current as your car draws. This is typically quoted as 20 amps. Pros avoid light bulbs and other resistive discharge devices because they don't maintain a constant 20A current. When a battery voltage drops, its discharge current drops proportionately.

Good Ni-Cds hold a constant voltage until they're almost completely discharged. Then the voltage drops quickly. So even a resistive discharger will main-

tain a constant discharge until the last 15 to 30 seconds. Though a fancy electronic discharger is ideal, resistive dischargers are fine for the masses.

To what level should you discharge? The idea is to use up all the energy in a battery before you recharge it. But is there any advantage to wrenching out every last electron when, for all practical purposes, the battery is dead when the car has stopped moving, or even when the car has slowed to a few mph? Pros suggest that you discharge to anywhere from 0.5 volt to 0.9 volt per cell (I prefer 0.9 volt). When your battery reaches 1 volt per cell during a race, everyone, including the ants, will lap you. Maybe stopping at 0.9 volt won't eliminate all memory, but if the battery remembers a voltage so low that it can't run your car, who cares?

CONCLUSION

Taking care of your batteries is easy. Use a high-quality peak-charger to fully charge—but never overcharge—batteries. Gear your car properly so that your battery doesn't overheat. Discharge after every race, and let your batteries cool before you recharge them. Finally, between races, store your batteries discharged.

*Addresses are listed alphabetically in the Index of Manufacturers on page 173.

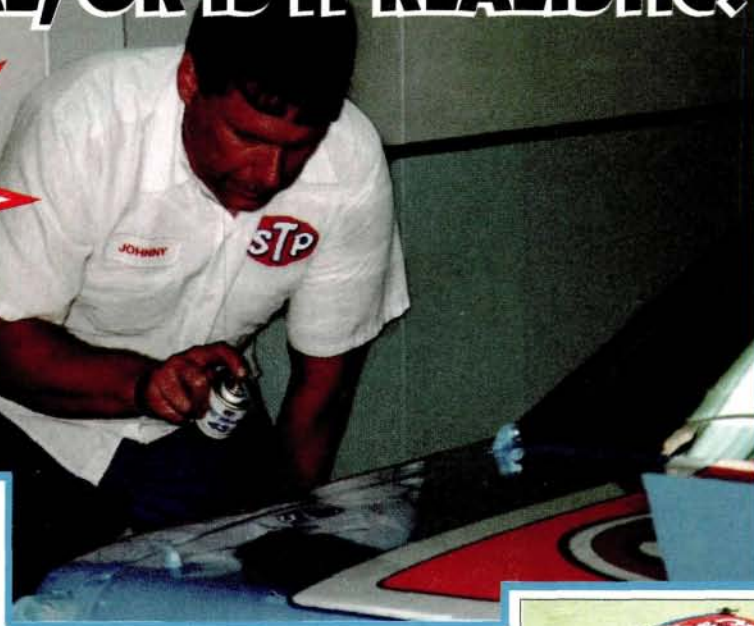
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IMPROVE YOUR LAP TIMES BY ADDING A FRONT SWAYBAR

(Continued from page 43)

arms, and the farther out on the arms they're attached the better. When one side of the suspension is compressed, the end of the bar attached to that side is pushed up. Since the other end of the swaybar is attached to the suspension on the opposite side, that side is pushed up as well, and the suspension on that side of the car is compressed to a degree controlled by the stiffness of the bar and the leverage of the suspension. When the outside front suspension is compressed in a hard turn, the swaybar also forces the opposite side of the suspension to be compressed as well. This keeps the chassis flat, instead of allowing it to lean toward the outside of the turn, and traction is maintained.

So, how did a swaybar fix my rear-end handling problem? In a tight, fast turn, a 4WD sedan without swaybars will pick up the inside rear tire, and this will cause the rear end to slide or spin out. When the chassis stays flat, this can't happen. Your car will maintain speed through the turns, so it seems as if you have a lot more horsepower than the other racers. In reality, you're just able to put much more power to the ground through the turn and maintain your momentum along the straightaway.

The other benefit of this installation is that your car won't get tossed off line as much when you get whacked. Let's face it, sedan drivers race with their elbows out, and you'll get hit from time to time. In that situation, a car that's loose at both ends will wind up facing the wrong direction all too easily and will be vulnerable to oncoming traffic.

IS IT LEGAL?

As far as I can tell, there's nothing illegal about installing a swaybar up front. Other brands of cars (HPI*, Kyosho*, Yokomo*, etc.) have optional front swaybars, so the idea is certainly nothing new. While Tamiya doesn't offer a front swaybar for the TA01 and 02 chassis (the new TA03 comes equipped with both front and rear swaybars), their rear swaybar fits just as well on the front. Since it's a stock Tamiya part, I guess that most rules would let you run it up front. The rules for my local series mandate the use of Tamiya parts only, except for bodies, wheels, tires, gears and electrics, so using a front swaybar is OK. If you're unsure about the rules for your local parking lot group, I suggest that you ask the race director. After last week's race, I expect to see more than a few of my fellow competitors showing up with a swaybar mounted on front of their Tamiya touring cars!

*Addresses are listed alphabetically in the Index of Manufacturers on page 173.

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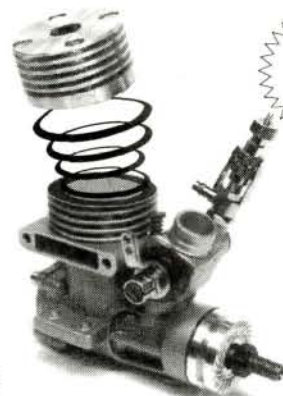


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YOKOMO YZ-10 WORLDS CAR

(Continued from page 48)

turns, it dived into the corners and accelerated smoothly out of them. Next, I went into the first big jump. After I had hit it and watched the car endo 5 feet after it, I thought it was done for. But the turn marshal flipped it over, and I cruised through the rest of the track without a problem. I used the stock 30WT oil. I knew the damping was too light because it was bottoming out. So I headed back to the pit to do some shock work. In the article about Mark Pavidis's car, he said he used 40WT oil in the front and 30WT in the rear. I tried his setup. The car ran very well and jumped easily. The monster jumps no longer posed a threat. The surface of the R/C Madness track is very loose top dirt that is hard-packed underneath. Needless to say, the tires in the kit did not hook up because they were for a hard-clay surface. I mounted Pro-Line* Fuzzies on the four corners, and the car was dialed.

FINAL THOUGHTS

While racing R/C cars for more than 11 years, I have had a lot of exposure to cars and concepts. In the past, 4WD racing was a popular racing class, and I enjoyed running these cars. Unfortunately, in the area where I race, the class has died off. I asked people why they do not run 4WD cars, and their answers centered on three main points: cost, dependability and availability of parts. True, these cars cost more, parts are somewhat harder to get and older cars were not very dependable (meaning they break often). But with the introduction of the new Yokomo YZ-10, I believe that attitudes will change. Its price may seem a little high, but keep in mind that you are buying a competition vehicle with many upgrades. Yokomo's light but strong chassis and suspension components are very durable. I jumped it off 3-foot jumps, and the car endoed, flipped, barrel-rolled and more, and it came out unscathed! The parts have also become more accessible. Many mail-order stores and a few distributors carry Yokomo parts.

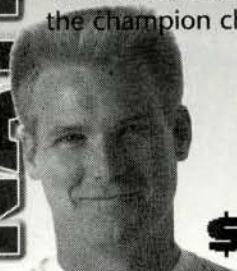
When I ran the car at the test track, it opened the eyes of many newcomers and made the regulars ponder its possibilities. Many people have asked me when a racing class will begin. With the YZ-10, everyone will be able to enjoy a fast competition car that is more dependable than its predecessors.

*Addresses are listed alphabetically in the Index of Manufacturers on page 173.

CHAMPIONS

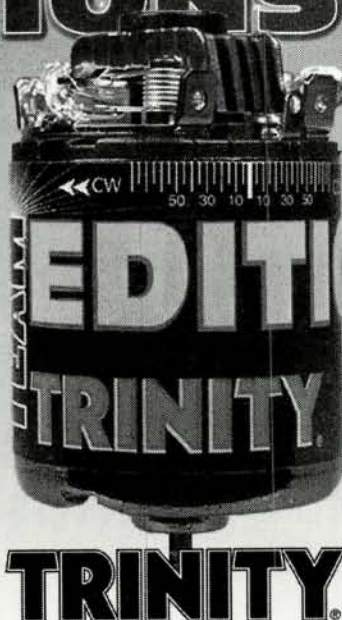
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NORRCA OFF-ROAD NATS

(Continued from page 92)

There was some confusion as to why this happened. I suppose only J.R. knows for sure, but the bottom line was that the first lap-and-a-half of this race wouldn't count. The third Main would be re-started in 15 minutes.

At the sound of the horn, Mark moved into the lead. He had a little more breathing room than in the previous start, but Greg was closing in. Halfway through the third lap, Greg made his move and passed Mark while Brian Kinwald settled into third. For another lap, Greg continued to lead until he clipped the pipe at the inside of the sweeper heading toward the table-top. Mark got past Greg, and Brian remained in third. Greg landed on the triple that had claimed Brian's truck in the second Main, and he popped off the bottom of his shock. It looked as if Mark was on his way to the overall win, but the fat lady wasn't yet singing. Brian drove like a man possessed and caught Mark. In the next lap, Brian passed Mark and set the stage for another classic race between them. The two battled for the remaining 3 minutes of the race. For the rest of the race, they swapped the lead, rubbed fenders and bumped and ground. All of this close racing action had the full attention of the crowd, and Sohrab hoped that Mark and Brian would keep it up. Sohrab had come out of nowhere and was close behind in third place. The horn sounded, and as the three trucks came through the S-turns, Mark clipped the back of Brian's truck and the two tangled. Brian got free and crossed the line for the win, Sohrab squeaked past Mark to take second, and Mark settled for third. What did this do to the overall standings? With his bad luck in the first two races, Brian was out of the hunt for the overall win; Sohrab had a fourth and a sixth in the first two, so he could not take the title. Mark's third-place finish put him 1 point behind Greg in second overall. Even though Greg had broken down in the last Main, he captured the overall win and his second national title this weekend. With a third and a second, Brian Dunbar finished third overall. In fourth and fifth were Sohrab (fourth/second) and Alex Guerrero (third/fourth).

A JOB WELL-DONE

Greg's victories in both Factory classes helped Team Losi win the cup for the best off-road team at the '96 NORRCA Nationals. Congratulations to all the winners at this year's event and to the staff at RCRC for another job well-done. It will be difficult for next year's event to provide the excitement of this year's Factory Truck class. I just hope that next year, the race will be held somewhere not quite so hot!

*Addresses are listed alphabetically in the Index of Manufacturers on page 173.

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TEAM LOSI DOUBLE-X 'CR'

(Continued from page 56)

Trinity Team Kinwald 13-turn triple. Ahhhh, modified...what a difference. When I popped in the motor and raced in the modified class, the 'CR' was as poised and confident as ever, and luckily for me, I was still way ahead of the pack. The 'CR' seemed to massage out all the track's bumps and blemishes. The power of a modified motor tends to magnify the flaws in any car's handling, but it intensified the 'CR' superior handling. The car is nearly perfect in all aspects. If you want to seriously get into off-road racing, then you must give this car a look-over. If you already have a Double-X, you're in luck—Team Losi offers a rear-suspension conversion kit that will update your stock suspension to 'CR' spec for only \$24.95. What a bargain!"

FINAL THOUGHTS

When the Double-X was released back in 1993, it was revolutionary. Three years later, can the same thing be said about the 'CR'? Well, no, not really. What *can* be said about it is this: it is a complete factory ride. It incorporates all the latest, trickiest team mods, such as the new 3-degree rear end and new suspension arms, and it tosses in a few other new goodies, such as the cool battery strap and new body and wing. I'm sure racers will have a few questions about the new car. Most frequently asked will probably be, "Is it that much better than a Double-X?" Well, yes, it is that much better than a Double-X. The 'CR' retains everything we've come to love about the Double-X: its superb handling on rough tracks, its awesome steering, ease of maintenance and so on; but it also gives us more—better performance! As my esteemed colleague Mr. Buono stated earlier, "The car is nearly perfect in all aspects. If you want to seriously get into off-road racing, you must give this car a look-over." I totally concur.

*Addresses are listed alphabetically in the Index of Manufacturers on page 173. ■

FLIGHT DECK RACE

(Continued from page 117)

(courtesy of Traxxas and Mike Jenkins), and anyone could have a chance to drive an R/C truck. Although these drivers weren't racing for prizes, several exciting, head-to-head races went on between crew from different parts of the ship. Races on the "try-me" track began at 9:30 a.m. and ran nonstop until 3:30 p.m. These races demonstrated the toughness of Traxxas's new breed of ready-to-run trucks.

Hobby Shack invited Tamiya America along to help set up a mini trade show. Tamiya displayed all of its latest products, including the Volkswagen Bug. On display at the Hobby Shack booth was its full line of products, including airplanes and boats. To get the crew in touch with the national racing scene, hundreds of issues of *R/C Car Action* were handed out.

The crew got a chance to see firsthand what the R/C hobby is all about. The sailors were even given a taste of R/C aircraft flying. Hobby Shack took along its computer and a Dave Brown R/C Flight Simulator for everyone to try. Between two of the heats, a Hobby Shack pilot flew the Global Tornado airplane from the flight deck. The "oohs" and "ahhs" notwithstanding, the pilot landed safely, even though there was a crane at the end of the runway (man, was that crane operator nervous).

Next came a surprise only Hobby Shack could put together. The company had arranged for the Goodyear blimp to make a low pass over the ship. The captains of the Boxer and the blimp made radio contact and talked to the crews over the ship's PA system.

In the final race—a competition that would put some regular drivers to shame—these rookies raced the Tamiya sedans to a close finish. In the end, Ensign Qunones won the grand prize. Maj. Yarnell awarded him a trophy and tickets with pit passes to the Long Beach Toyota Grand Prix (courtesy, U.S. Navy). Tamiya awarded Ensign Qunones their latest BMW sedan.

Opportunities like this don't happen every day, but you can bet when they do, Hobby Shack is at the bottom of it! Hobby Shack and all involved created an impressive and professional event. And because the point of the event was to have fun with the Boxer's crew while demonstrating the R/C hobby, it should be noted that several U.S.S. Boxer crew members and Long Beach naval shipyard dockworkers are now R/C car enthusiasts.

You can count on us to be the first to find out what Hobby Shack will come up with next!

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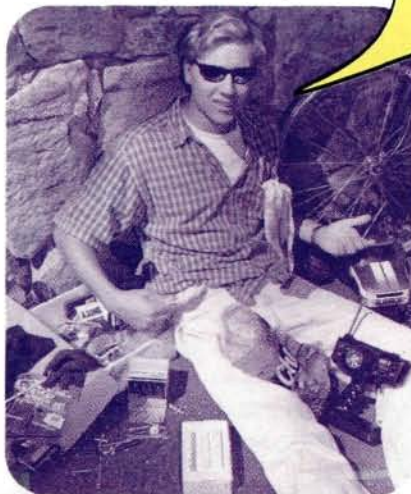
The Cheapest Man in Town

First, you just have to take a look at Air Age Publishing's basement to see that "cheap" Rob (see right) is very talented and a hard worker. But he is cheap. But let's set aside the issue of Rob's incredible cheapness for a moment. More important, there's a way in which he's representative of those of you who can't understand why you have so much trouble running your gas cars. Instead of servicing his glow engine, cleaning his truck and recharging his Ni-Cd glow-igniter battery, Rob would rather watch re-runs of "Mystery Science Theater 3000" while eating Oreos.

SPEND A LITTLE, SAVE A LOT

OK, now back to the cheapness issue. Listen, I understand that most of you are on a budget of some sort; so am I. All I ask is that you go to the hobby shop, spend about four bucks on a bottle of after-run oil and perform some simple maintenance tasks after every run. If you do, your "stupid

engines," as I know you've all referred to them at one time or another, will operate up to par the next time you run them. It's simple. If you go home and, after you've run it, insist on tossing your nitro burner into the corner like a baseball glove, don't come to me with your Internet whining about how glow engines suck. Are we clear?



Hello,
everybody. My name is Rob Wern. I'm Air Age Publishing's executive subterranean system coordinator (that means I keep things moving in the basement). I'm also the cheapest man in town. I'm so cheap that I shut my 6-cylinder '67 Malibu off when it's going downhill to save gas. I'm so cheap that I save cardboard toilet-paper-roll centers in the hope that someday, there will be a return deposit for them. I'm so cheap that I use an old Nine Inch Nails cassette case to hold my blown-out glow plugs. Right now you might be asking yourself, "Why does Rob save blown-out glow plugs?" Well, I just can't stand to throw anything out because **I'M SO CHEAP!!**

Here's all you need to do after every running session to protect the considerable investment you have tied up in your gas car:

- 1 Empty the fuel tank and fuel lines.
- 2 With the fuel line disconnected and the glow igniter connected, run the residual fuel out of the engine's crankcase at low throttle. This is very important. Alcohol is hygroscopic (that means it attracts moisture) and rapidly promotes corrosion if it is not removed after every session.
- 3 Remove the glow plug and air filter and put a few drops (three to five) of after-run oil directly into the glow-plug hole and into the carburetor venturi (open the throttle to full open so that the drops enter easily).
- 4 Give the pull-starter three or four brisk pulls so that the breathing of the engine's intake and exhaust distributes the after-run oil throughout the engine.
- 5 Replace the glow plug and air filter.
- 6 Go get the Oreos and switch on "Mystery Science Theater 3000."

Chris's



This is my page—mine!

The opinions expressed on this page do not necessarily represent the opinions of the entire Car Action staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to "Chris's Back Lot," c/o R/C Car Action, Air Age Publishing, 100 East Ridge, Ridgefield, CT 06877-4606. My Internet address is: chriscc@airage.com.



Chris, you don't have a clue! At USA Raceways where I race, people worry about making 4 minutes, let alone 5! That goes for stock and mod classes, too. If racing time were moved up to 5 minutes, *everyone* who doesn't have 30A cells with high numbers like 500 would have to gear down. That means racing speeds would decrease drastically. Watching the world championships would be like watching grass grow! Hey, you have got to get Kinwald's and Pavidis's opinions on this, too. Oh, before I close, Frank is 100% correct!

Ken Herman
viperr@juno.com

So, you and your fellow racers have trouble making 4 minutes. Do tell. Wait!—I've got it! Maybe you

and your buddies should go to 5-turn drag motors and start running 1-minute heats. Yeah, that's the ticket! No, never mind. The guys who want to run a 40-tooth pinion would probably start complaining that they couldn't make the full 1 minute. Maybe the time has come to consider 45-second heats; at least the field would stay tight for the duration of the heat.

I suppose you think the Japanese and Europeans are content with boring races. Ever see any of their 5-minute heats?—hardly boring. Who doesn't have a clue? You complete and total squash-brain!

I guess the rest of the world and IFMAR don't have a clue either. My advice to you: go mow the lawn—with scissors.

Here endeth the lesson.

C.C.